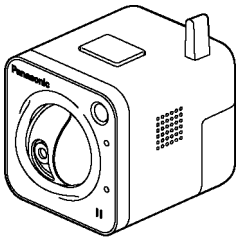
ORDER NO. KMS1001748CE
F15

Service Manual

Network Camera

Model No. BL-C230A

(for U.S.A.)



BL-C230A

www.electronicsrepair.net

⚠ WARNING

This service information is designed for experienced repair technicians only and is not designed for use by the general public.
It does not contain warnings or cautions to advise non-technical individuals of potential dangers in attempting to service a product.
Products powered by electricity should be serviced or repaired only by experienced professionaltechnicians. Any attempt to service or repair the product or products dealt with in this service information by anyone else could result in serious injury or death.

IMPORTANT SAFETY NOTICE

There are special components used in this equipment which are important for safety. These parts are marked by ⚠ in the Schematic Diagrams, Circuit Board Diagrams, Exploded Views and Replacement Parts List. It is essential thatthese critical parts should be replaced with manufacturer's specified parts to prevent shock, fire or other hazards. Do not modify the original design without permission of manufacturer.

IMPORTANT INFORMATION ABOUT LEAD FREE, (PbF), SOLDERING

If lead free solder was used in the manufacture of this product the printed circuit boards will be marked PbF.
Standard leaded, (Pb), solder can be used as usual on boards without the PbF mark.
When this mark does appear, please read and follow the special instructions described in this manual on the use of PbF and how it might be permissible to use Pb solder during service and repair work.

When you note the serial number, write down all 11 digits. The serial number may be found on the unit.

Panasonic®

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1 Warning

1.1. Battery Caution

Danger of explosion if the battery is replaced incorrectly. Replace only with the same or equivalent type recommended by the manufacturer. Discard used batteries according to following caution:

Disposal or transportation of lithium batteries should be performed by permitted, in accordance with federal, state and local guidelines.
A battery continues to have no transportation limitations as long as it is separated to prevent short circuits and packed in strong packaging.
Commercial firms that dispose of any quantity of lithium cells should have a mechanism in place to account for their ultimate disposition. This is a good practice for all types of commercial or industrial waste.
When the lithium battery is exchanged, the clock settings are cleared. In this case, make clock settings again.

Recommend Type Number:
N4BCY48Y0001(CR2032NT23) (BT901) Manufactured by HITACHI MAXELL
CR Coin Cell Lithium Battery Information:
This product contains a CR Coin Cell Lithium Battery which contains Perchlorate Material-special handling may apply.
See www.dtsc.ca.gov/hazardouswaste/perchlorate

1.2. About Lead Free Solder (PbF: Pb free)

Note:

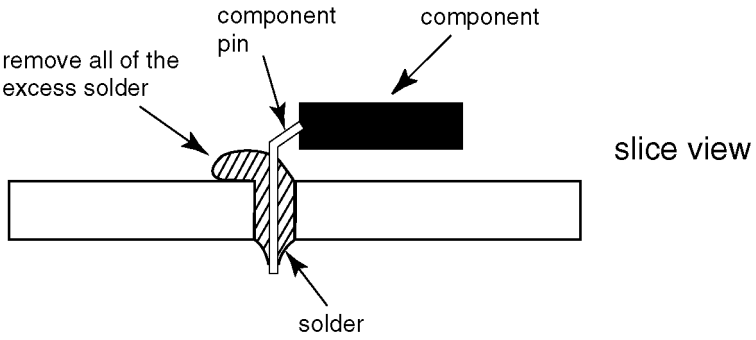
In the information below, Pb, the symbol for lead in the periodic table of elements, will refer to standard solder or solder that contains lead.

We will use PbF solder when discussing the lead free solder used in our manufacturing process which is made from Tin, (Sn), Silver, (Ag), and Copper, (Cu).

This model, and others like it, manufactured using lead free solder will have PbF stamped on the PCB. For service and repair work we suggest using the same type of solder.

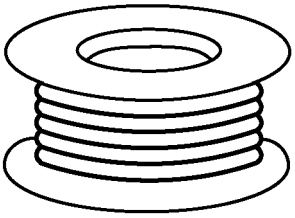
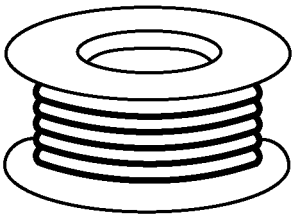
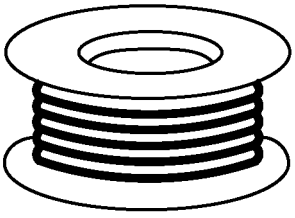
Caution

- PbF solder has a melting point that is 50° F ~ 70° F (30° C ~ 40° C) higher than Pb solder. Please use a soldering iron with temperature control and adjust it to 700° F ± 20° F (370° C ± 10°C).
- Exercise care while using higher temperature soldering irons.:
  Do not heat the PCB for too long time in order to prevent solder splash or damage to the PCB.
- PbF solder will tend to splash if it is heated much higher than its melting point, approximately 1100°F, (600°C).
- When applying PbF solder to double layered boards, please check the component side for excess which may flow onto the opposite side (See figure, below).



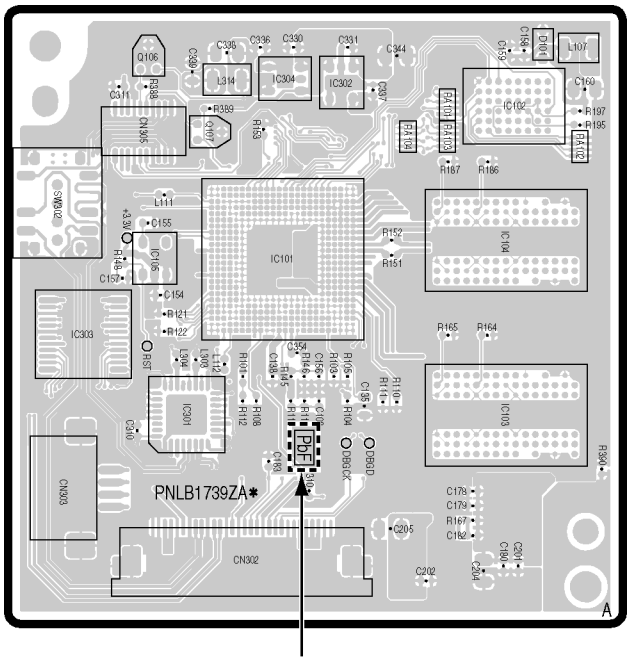
1.2.1. Suggested PbF Solder

There are several types of PbF solder available commercially. While this product is manufactured using Tin, Silver, and Copper, (Sn+Ag+Cu), you can also use Tin and Copper, (Sn+Cu), or Tin, Zinc, and Bismuth, (Sn+Zn+Bi). Please check the manufacturer's specific instructions for the melting points of their products and any precautions for using their product with other materials. The following lead free (PbF) solder wire gauge are recommended for service of this product: 0.3mm, 0.6mm and 1.0mm.

0.3mm X 100g	0.6mm X 100g	1.0mm X 100g
		

1.2.2. How to Recognize That Pb Free Solder is Used

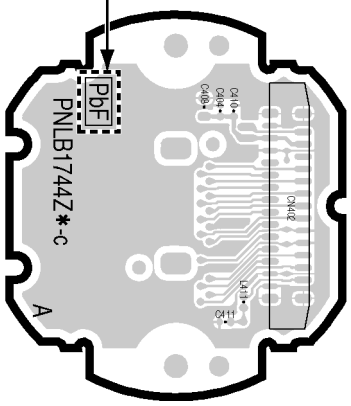
MAIN BOARD



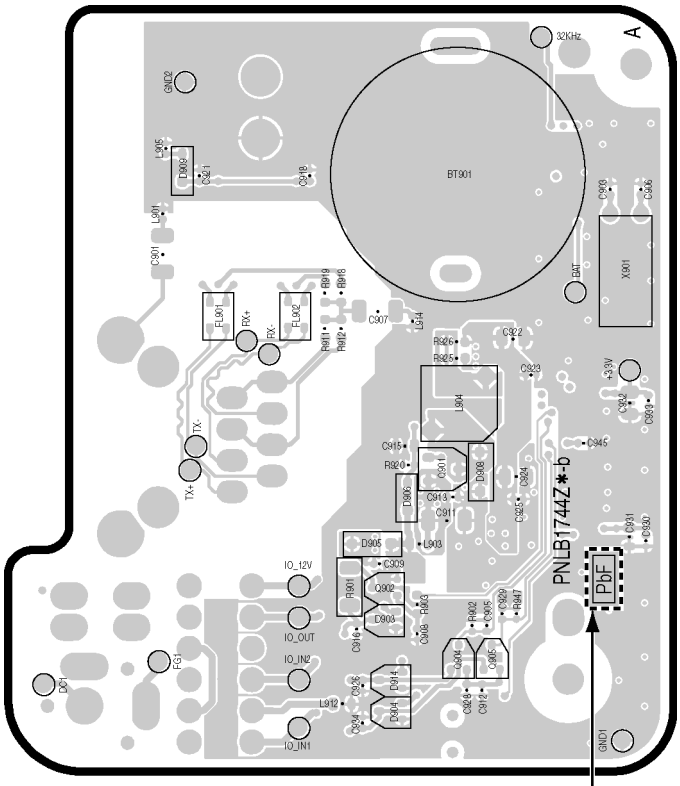
Marked PbF (PbF is marked around here)

LENS BOARD

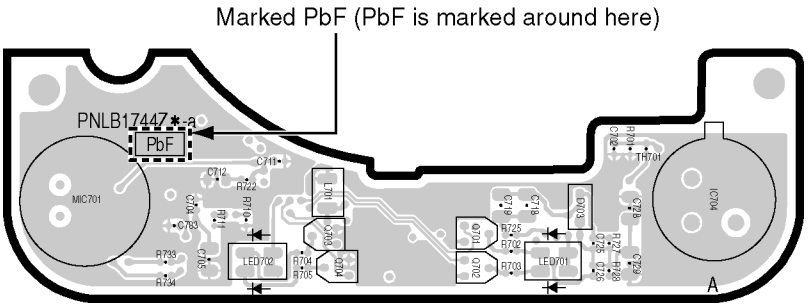
Marked PbF (PbF is marked around here)



IO BOARD



SENSOR BOARD



1.3. For Service Technicians

Repair service shall be provided in accordance with repair technology information such as service manual so as to prevent fires, injury or electric shock, which can be caused by improper repair work.

1. When repair services are provided, neither the products nor their parts or members shall be remodeled.
2. If a lead wire assembly is supplied as a repair part, the lead wire assembly shall be replaced.
3. FASTON terminals shall be plugged straight in and unplugged straight out.

ICs and LSIs are vulnerable to static electricity.

When replacing, the following precautions will help to prevent recurring malfunctions.

1. Cover the plastic parts with aluminum foil.
2. Ground the soldering irons.
3. Use a conductive mat on the work-table.
4. Do not grasp IC or LSI pins with bare fingers.

1.4. Trademarks

- Microsoft, Windows, Windows Vista, Hotmail, ActiveX, Internet Explorer, Windows Media, DirectShow, and DirectDraw are either registered trademarks or trademarks of Microsoft Corporation in the United States and/or other countries.
- Screen shots reprinted with permission from Microsoft Corporation.
- VIERA Link™ is a trademark of Panasonic Corporation.
- VIERA CAST™ is a trademark of Panasonic Corporation.
- All other trademarks identified herein are the property of their respective owners.

2 Specifications

Camera Specifications

Items	Specifications
Zoom	3x (by length) ActiveX zoom
Pan/Tilt Angle	Pan: -41 ° to +41 °, Tilt: -32 ° to +10 °
Image Sensor	1/4 inch CMOS sensor, 320,000 pixels
Illuminance	5-10,000 lx (3-10,000 lx when in Color Night View mode)
White Balance	Auto/Manual/Hold
Lens Brightness	9 levels
Focus	Fixed, 0.3 m- Infinity
Minimum Object Distance	0.3 m (1 foot)
Aperture (F No.)	F2.8
Horizontal Viewing Angle	58 °
Vertical Viewing Angle	45 °
Exposure	Auto

Other Specifications

Items	Specifications
Image Compression	JPEG (3 levels), MPEG-4, H.264
Image Resolution	640 x 480, 320 x 240, 192 x 144
Buffered Images*1	About 1160 frames (320 x 240, standard image quality) with time display
Audio Communication	Camera to PC
Audio Compression Format	H.264: MPEG-2 AAC (AAC-LC) 64 Kbps MPEG-4/MJPEG: ADPCM 32 kbps
Audio Bandwidth	300 Hz-3.4 KHz
Audio Reception Method	ActiveX
Audio Reception Decoding	ActiveX
Audio Input	Built-in microphone
Audio Output	Built-in speaker
External Input/Output Interface	External sensor input × 2 External output × 1
Frame Rate*2	Max. 30 frames/second (640 x 480, 320 x 240, 192 x 144)
Communication Protocols	IPv4/IPv6 Dual-Stack **IPv4:** TCP, UDP, IP, HTTP, FTP, SMTP, DHCP, DNS, ARP, ICMP, POP3, NTP, UPnP™, SMTP Authentication, RTP, RTSP, RTCP, HTTPS, SSL, TLS, Auto IP **IPv6:** TCP, UDP, IP, HTTP, FTP, SMTP, DNS, ICMPv6, POP3, NDP, NTP, RTP, RTSP, RTCP, HTTPS, SSL, TLS
Image Buffer/Transfer Triggers	Timer, Sensor, Alarm 1, Alarm 2, Motion Detection, Sound Detection
Image Transfer Method	SMTP*3, FTP, HTTP
Wired LAN Interface	10Base-T/100Base-TX Ethernet RJ-45 connector
Sensor Detection Method	Pyroelectric Infrared Sensor
Sensor Detection Range*4	Horizontal: About 28 ° Vertical: About 71 ° Distance: About 5 m (16 feet 5 inches) when in a 20 °C (68 °F) environment
POWER Indicator Display	Power Camera Operation Ethernet Link
AV LINK Indicator Display	AV Link
Dimensions (W x H x D)	74 mm x 74 mm x 101 mm (2 15/16 inches x 2 15/16 inches x 4 inches)
Weight (Main Unit Only)	260 g (0.57 lb.)
Power Supply	AC adaptor (order no. PQLV206Y) Input 100-240 V AC, 50/60 Hz Output 9 V DC, 750 mA
Maximum Power Consumption	About 4.0 W (7.7 W during pan/tilt scan)
Operating Temperature	Operation: +0 °C (+32 °F) to +40 °C (+104 °F) Storage: -10 °C (+14 °F) to +50 °C (+122 °F)
Operating Humidity	Operation: 20 %-80 % (no condensation) Storage: 20 %-90 % (no condensation)

Wireless Specifications

Items	Specifications
Communication Standard	IEEE 802.11b, 802.11b/g, 802.11g exclusive
Data Transfer Mode	IEEE 802.11b: Direct Sequence Spectrum Spread (DS-SS) IEEE 802.11g: Orthogonal Frequency Division Multiplexing (OFDM)
Frequency Range	2.412-2.462 GHz
Channel	1-11
Security	SSID, WEP (64/128/152 bit), WPA-PSK (TKIP), WPA2-PSK (AES)

*1) See 2.1. for details.

*2) Frame rate may decrease in the following situations.

-When buffering images

-When using color night view mode

-When many users are viewing camera images

*3) The camera supports POP Before SMTP Authentication and SMTP Authentication. PLAIN, LOGIN, and CRAM-MD5 SMTP Authentication are supported. SSL supports SMTP over SSL. STARTTLS is not supported.

*4) When the temperature is 20 °C (68 °F)

2.1. Internal Memory Capacity for Buffered Images

The camera‘s internal memory can buffer images according to the table below.

Note

• All values are approximate.

• H.264 images cannot be buffered to the camera’s internal memory.

JPEG images (videos and still images)

Resolution	Specification	Snapshot	Image Quality		
			Favor Clarity	Standard	Favor Motion
640 x 480	File Size	50 KB	50 KB	35 KB	27 KB
	No. of Images	(Saved to PC)	360	520	680
320 x 240	File Size	25 KB	25 KB	16 KB	10 KB
	No. of Images	(Saved to PC)	730	1160	1880
192 x 144	File Size	10 KB	10 KB	7 KB	5 KB
	No. of Images	(Saved to PC)	1880	2710	3850

Note

• The maximum number of images that can be buffered depends on image resolution and image quality.

MPEG-4 videos

For information about MPEG-4 image capacity, see the Panasonic Network Camera support site at http://panasonic.net/pcc/support/netwkcam/.

Note

• The maximum amount of video that can be buffered depends on image resolution, network bandwidth, and the frame rate and bit rate set for the streaming method.

2.2. Compatible Panasonic VIERA TVs

The camera is compatible with the following Panasonic VIERA TVs (as of October, 2009).

G10 series, G15 series, V10 series, Z1 series

3 Features

On-site and remote camera monitoring

Camera images can be monitored from a PC, both on-site and over the Internet. You can even use your mobile phone to view still images when you're out of the house.

H.264, MPEG-4 and Motion JPEG (MJPEG) support

Live camera images can be viewed and buffered (i.e., stored in memory) in H.264, MPEG-4 and JPEG (MJPEG) formats, allowing you to select the video format that best suits your needs.

Built-in sensor (human detection sensor)

The camera features a built-in pyroelectric infrared sensor, which uses infrared rays to detect temperature differences within its range that are emitted naturally by people, animals, etc. The sensor can be used to trigger the camera to buffer (i.e., temporarily store) camera images in its memory. You can view these images later as desired. The sensor can also be used to trigger the camera to transfer images to someone or somewhere, by FTP, E-mail, or HTTP.

Backlight Correction features

When this feature is enabled, the camera can automatically correct the contrast in dark areas of the camera image. This means even when there is backlight or a large amount of contrast in the image, the camera can correct the image to provide a more consistent, natural image.

Audio features

The camera features a built-in microphone that allows you to monitor the audio while viewing live camera images using your PC.

Detection feature

The camera's motion or sound detection feature allows you to buffer or transfer camera images when the camera detects motion or sound in the camera image.

Camera image buffering and playback

Camera images can be automatically buffered at specific times, when the camera's external sensors (customer-provided) are triggered, or when the camera detects motion. You can program the camera to buffer these camera images, and then you can play back these images later while accessing the camera or save them to your PC. You can also program the camera to transfer images by E-mail or upload them to an FTP or HTTP server as they are being buffered.

Digital zoom

When viewing camera images from a PC, you can zoom up to 3× (by length) and get a closer look. You can use your mouse to zoom in and out simply.

Protecting your privacy

Simply press the camera's PRIVACY button to hide the lens from view and protect your privacy. You can even activate the privacy mode while away from home.

UPnP™ support

When connecting the camera to a UPnP™ compatible router, the camera's network settings can be automatically configured, making setup quick and easy.

Viewnetcam.com support

After registering your camera with the Viewnetcam.com service, you can access the camera while away from home using an easy to remember Internet address of your choosing, such as *****.viewnetcam.com.**

Multi-language support

All camera pages can be displayed in English, French, German, Italian, Spanish, Russian, Simplified Chinese, and Japanese. The most commonly used camera pages can be displayed in Korean.

Wireless connectivity

The BL-C230 supports wireless standards IEEE 802.11b and IEEE 802.11g, giving you the option of using the camera in either wired or wireless mode. When used in wireless mode, WEP, WPA-PSK(TKIP), and WPA2-PSK(AES) support ensures that access to the camera is secure.

4 Technical Descriptions

4.1. Main Board

4.1.1. CPU Block

CPU (IC101)

Operating Power Supply: 3.3 V (for I/O) 1.2 V (for Core)
Package: 433 pin Ball BGA
Outline of Operation: This LSI encodes a picture signal input from a camera into a JPEG, an MPEG4 or an H.264 format and an audio signal input from a microphone into a AAC-LC format, and then it distributes the data to the terminal on the IPV4 or IPV6 network using the network server function achieved by processing the software of a built-in processor.
CMOS sensor (IC712), Audio codec (IC709) and Real Time Clock IC (IC902) are accessed by I2C I/F.
Ethernet PHY (IC301) is accessed by MII (Media Independent Interface) I/F.

FLASH MEMORY (IC102)

Operating Power Supply: +3.3 V
Package: 18 pin Ball BGA
Capacity: 64 Mbit
Access Time: 70 ns
Outline of Operation: Stores programs for CPU operation, MAC address and customer setup data. Version up is available from Ethernet I/F.

DDR2 SDRAM (IC103/IC104)

Operating Power Supply: 1.8 V
Package: 84 pin Ball BGA
Capacity: 512 Mbit
Outline of Operation: Stores the memory for CPU work and temporary saved images.

RESET IC (IC105)

Reset voltage: 2.9 V
Package: 5 pin SOT-23-5
Outline of Operation: When 3.3V power starts up, it emits about 50ms reset pulse after detecting 2.9V.

Clear Setting Button (SW903)

Outline of Operation: It is possible to bring back the setting value of a Network Camera to a factory-shipments state, when you push.

4.1.2. LAN Block

Consists of IC101 (CPU), IC301 (ETHER-PHY), T901 (Trans) and JK901 (RJ45).
T901 (Trans) insulates sets and Ethernet.

ETHER-PHV (IC301)

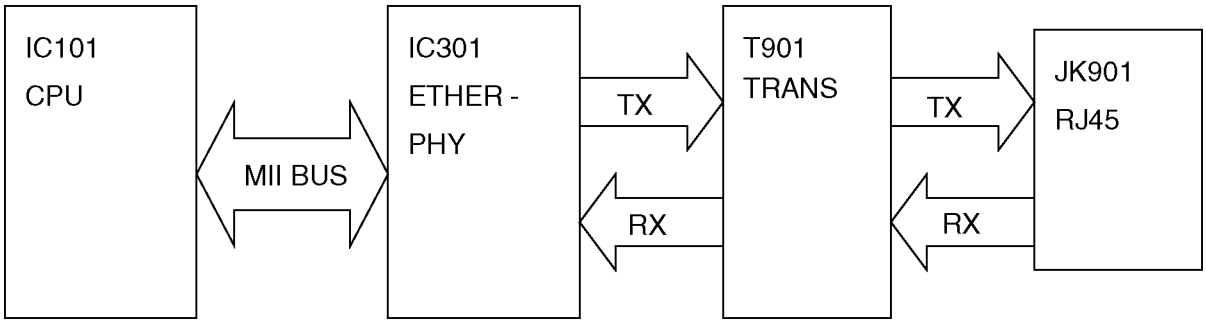
Operating Power Supply: 3.3 V
Package: 32 pin QFN
IC101 (CPU) and IC301 (ETHER-PHY) are connected by a signal called MIIBus which it makes it possible to transmit/receive Ethernet data.
IC301 has Auto Negotiation Function which changes 100BASE-T or 10BASE-TX automatically.

Transmitting Operation

Electric signal from IC101 is changed to Ethernet data on IC301 and it is sent through T901 from JK901.

Receiving Operation

Ethernet data from JK901 is change to electrical signal on IC301 and it is received by IC101.
JK901 is including the Power Supply (DC9 V) from the Power Supply Unit which is different from the Ethernet data mentioned above.



4.1.3. RTC block

Real Time Clock (IC902)

Operating Power Supply: 3.3 V (3 V battery for back up)
Package: 10 pin SOP
Outline of Operation: Stores Clock Data and resonates Clock Signal from CPU (IC101) when it starts up.
Backup Battery provides power when power supply is out.

Lithium Battery (BT901)

Output Voltage: 3 V
Capacity: 240 mAh
Outline of Operation: A backup power supply for Real Time Clock (IC902).

4.1.4. CMOS Block

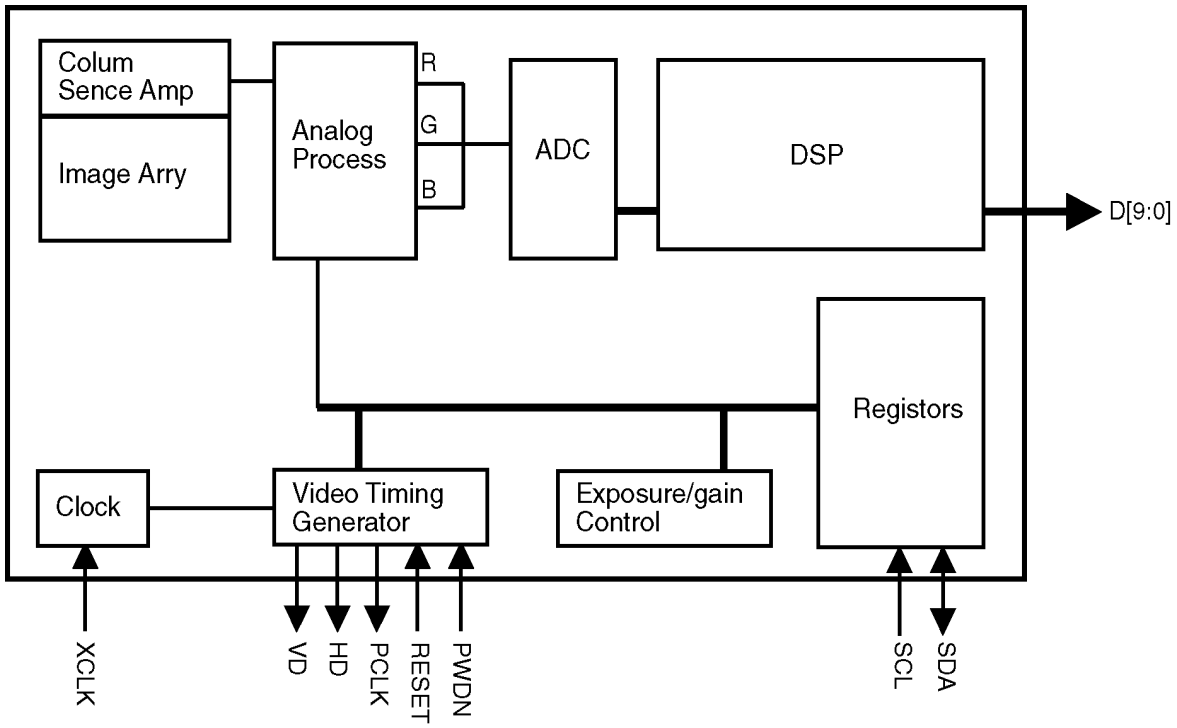
This CMOS image sensor which consolidates sensor section and image process DSP consists of one chip. Each pixel has a micro lens for increased sensibility. It changes optical energy to analogue voltage. After that, analogue pixel voltage is converted into digital using the 10 bit AD Converter (ADC).

Analogue pixel voltage data which is converted to digital colored image signal is finished using DSP. Those signals are sent out as digital format 8 bit span YUV with PCLK, HD and VD signals as a timing interface. In addition, the Image Processing Function of AE (Auto Iris) and AWB (Auto White Balance) is installed and it is automatically operated following an algorithm in the chip.

Setting up of each chip register is set at I2C by CPU (IC101) on Main Board.

CMOS sensor module (IC401)

Package: 27 pin module
Available Number of Pixels: 640 x 480 pixels
Image Area: 1/4 inch Optical Size
Input Clock: 13.5 MHz
Operating Power Supply: AVDD=+3.1 V DOVDD=+1.8 V DVDD=+1.8 V



4.1.5. Sound Block

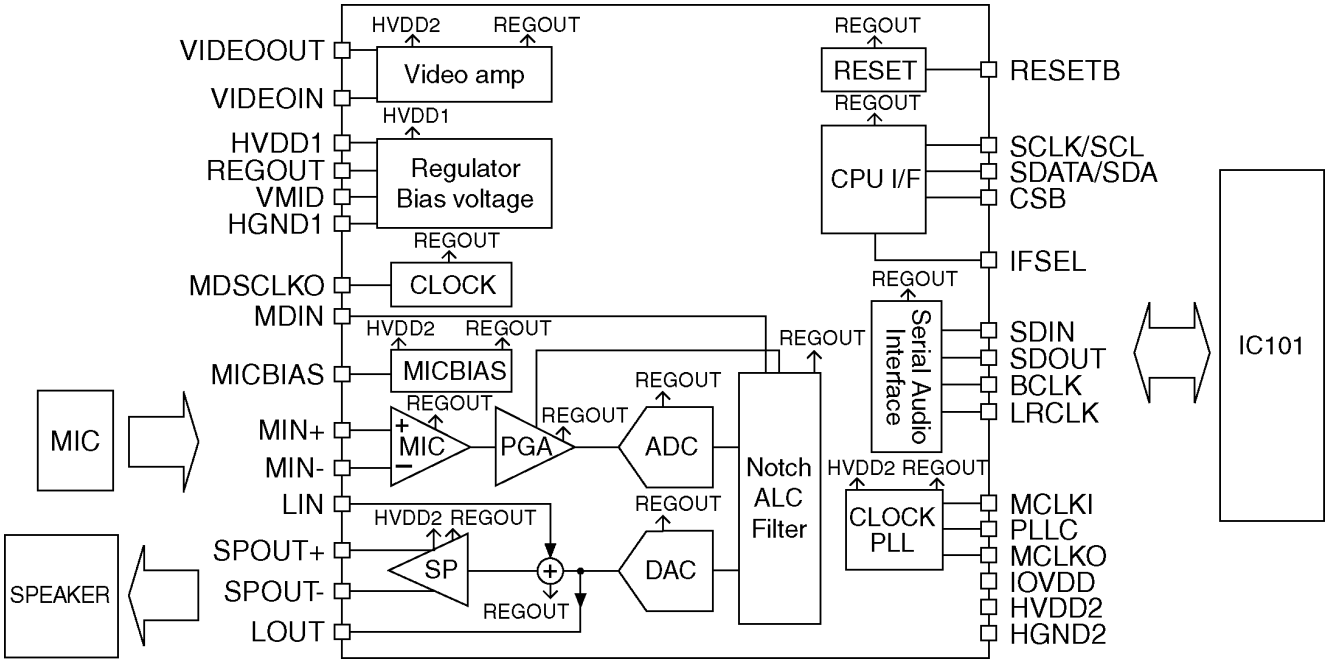
Microphone(MIC701)
Input sound.

PCM Codec (IC702)
Power Supply Voltage: 3.3 V
IC702 with built-in microphone amplifier, speaker amplifier and video amplifier is a low powered, compact, monaural codec.
A regulator to stabilize the characteristics of the codec which is sensitive to noise is equipped.
IC702 can keep the audio performance unchanged by the characteristics of the power supply circuit.
In digital signal processing, HPF, notch filter and 5 Band Equalizer are equipped for noise reduction in some bandwidth and this makes sound effect processing more flexible.

Flow of Sound Signal
[Microphone sound]

1. The sound data input from the microphone is amplified by the amplifier in the PCM Codec (IC702) and built-in ALC. The data is converted to the digital signal by the ADC, then the PCM data in the form of 8 KHz/8 bit is output through the Serial I/F to the IC101 on the CPU board as the 64kbps data.
2. The PCM Codec (IC702) supplied 12MHz CLK from the host CPU (IC101), generates 8KHz and 56KHz in the built-in PLL circuit and transfers the serial data.
   IC702 is controlled by CPU (IC101) using the I2C and registered.

[Speaker sound]
The PCM Codec (IC702) receives the data of the speaker sound which has been previously assigned and outputs it to the speaker through DAC.



4.1.6. Pyroelectric Infrared Sensor Block

Pyroelectric Infrared Sensor (IC704)
Operating Power Supply: +3.1 V (+A3.1 VS)
Package: 3 pin Board Insertion Type
Changes temperature variation into analogue signal which it emits when a heat source, such as a person, comes into detection area.
The analogue signal is amplified by Operational Amplifier (IC703).

Circuits Built-in Operational Amplifier (IC703)
Operating Power Supply: +3.1 V (+A3.1 VS)
Amplifies analogue signal from Pyroelectric Infrared Sensor (IC704).
Amplified analogue signal input the AD input terminal in CPU (IC101)

Analogue Switch (IC701)
Operating Power Supply: +3.1 V (+A3.1 VS)
Package: 8 pin SSOP
Switches the gain setting of the Operational Amplifier(IC703). The terminal status below shows each gain setting.

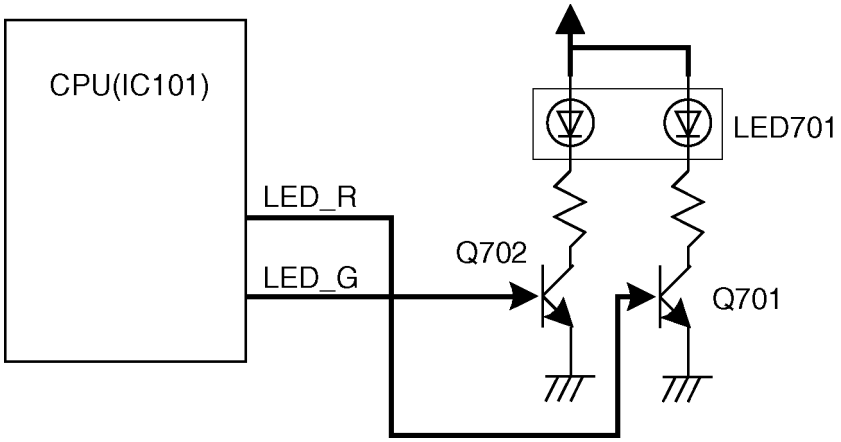
GAIN1 (IC701-7pin)	GAIN2 (IC701-3pin)	GAIN
0	0	71.2
1	0	63.4
0	1	60.2
1	1	57.2

Operation of Pyroelectric Infrared Sensor

1. Pyroelectric Infrared Sensor (IC704) emits analogue signal, when a heat source, such as a person, moves into the detection area.
2. Above signal is amplified by Operation Amplifier (IC703) which emits analogue signal.
3. Above signal is input to AD of CPU (IC101) and the signal amplitude exceeds the specified voltage range, a reaction occurs.

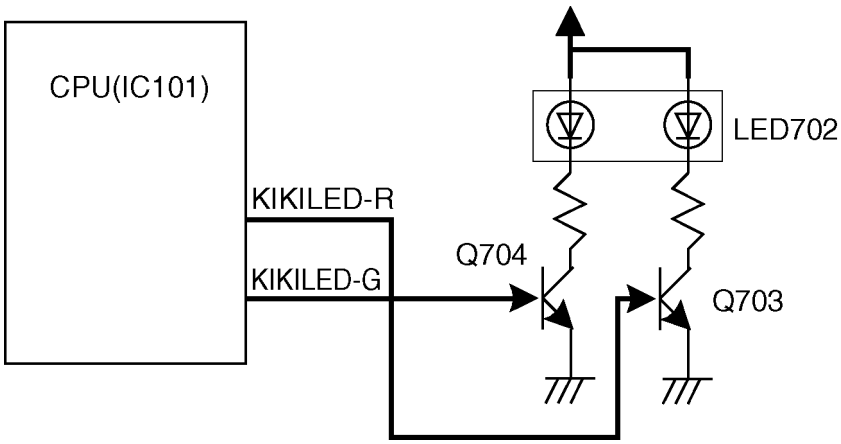
4.1.7. LED Control Block

LED is controlled by CPU which is mounted on Main Board. Control data is input into LED Control Circuit. (Three color LED is employed.)



LED_R	LED_G	Color of LED
L	L	OFF
L	H	Green
H	L	Red
H	H	Orange

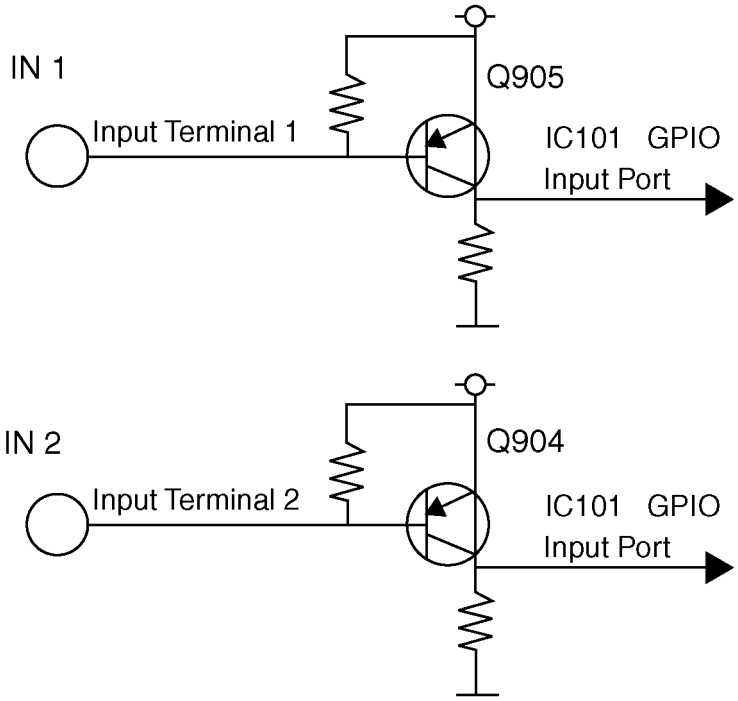
LED is controlled by CPU which is mounted on Main Board. Control data is input into LED Control Circuit. (Three color LED is employed.)



LED_R	LED_G	Color of LED
L	L	OFF
L	H	Green
H	L	Red
H	H	Orange

4.1.8. I/O Terminal Block

The system of the Input terminal is connected to the Input Port of the IC101 GPIO.
Due to Internal Pull-up Resistance, the PNP Transistor (Q905,Q904) on the following level is usually in the OFF state and the Input Port connected to the collector is at L level.
If the terminal is short-circuited with the GND, or the signal of L level is input, the PNP Transistor goes ON and the Input Port goes to H level.
The CPU checks the state of this port regularly to detect a change in this signal.



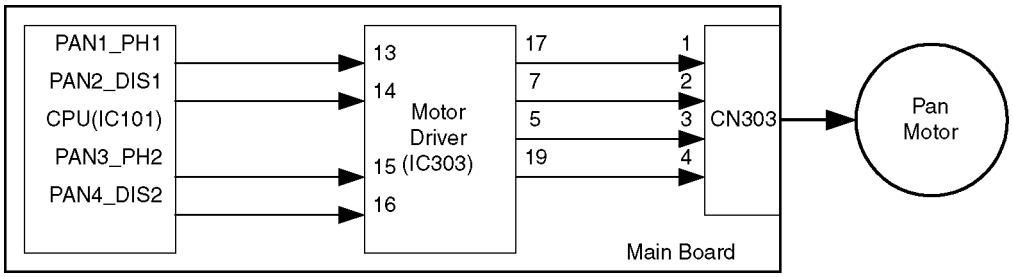
4.1.9. PAN Control Block

A pan motor is initiated when CPU (IC101) on a Main Board controls the Motor Driver IC (IC303) on the same board.

A Constant Voltage Bipolar Drive System is employed. The Voltage of Motor Power (VM) is 3.3V. Ø15 Stepping Motors are employed.

DC-DC Converter

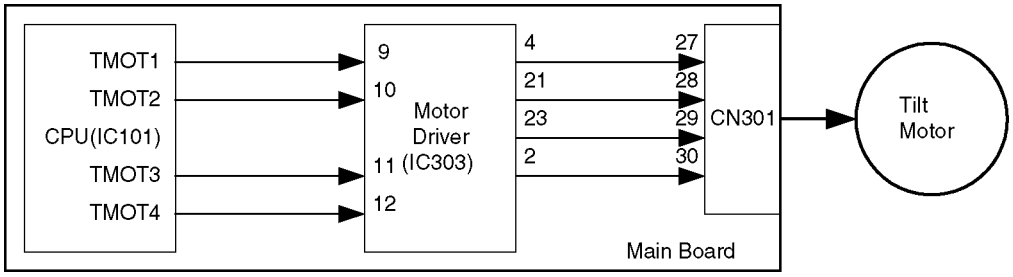
Package: 24 pin SOP



4.1.10. TILT Motor Control Block

A Tilt motor is initiated when CPU (IC101) on a main board controls the motor driver IC (IC303) on the same board.

A Constant Voltage Bipolar Drive System is employed. The Voltage of Motor Power (VM) is 3.3V. Ø15 Stepping Motors are employed.



4.1.11. Lens Control Circuit

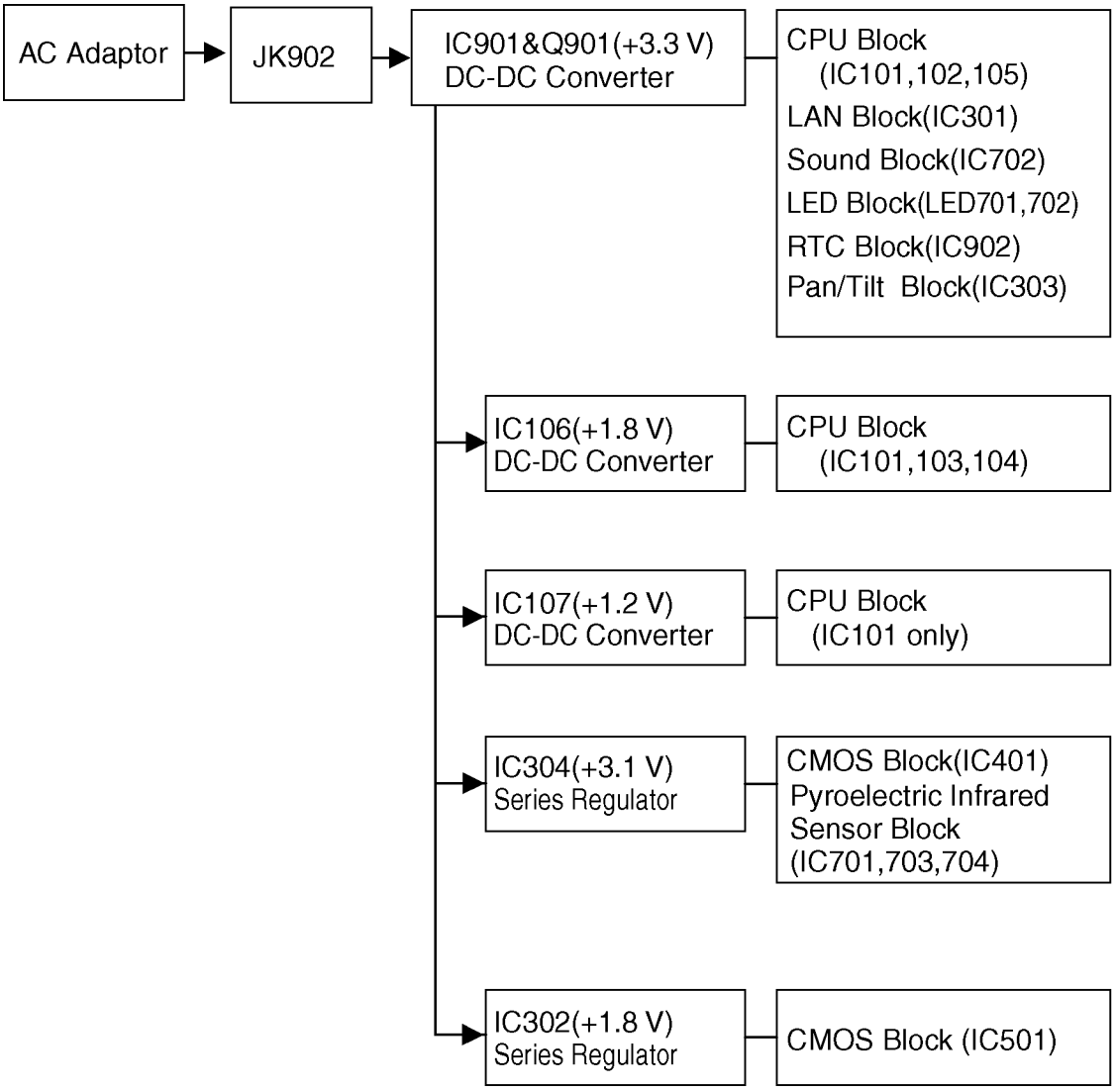
Press the lens button (SW101) to hide the lens from view and protect your privacy.

CPU detects the status of the SW101.

4.1.12. Power Supply Block and Camera Detection Circuit

Power Supply Block provides the power that each block consumes.

Input is DC9 V/750 mA from AC adaptor. The circuit diagram and output voltage are shown as below.



4.1.13. RF block

The digital section of RF block consists of transceiver IC & MAC/BB IC(IC601), SDRAM(IC603), Flash ROM(IC602), and IEEE802.3(u) Ethernet PHY(IC661).

The analog/RF section consists of a 2.4GHz channel for 802.11b/g. The analog/RF section consists of a transceiver IC, a power amplifier(IC501), and a low noise amplifier(Q501), in addition to matching and filtering elements.

Ethernet-PHY on the RF Board and Ethernet-PHY on the Main Board are connected with a switch and data communications are performed between CPU and MAC/BB IC.

Analog/RF Section

- a) Transmit

  Transceiver IC receives in-phase and quad-phase signal from MAC/BB IC. Frequency is changed by two steps of mixers inside IC. The 1st mixer outputs 1.6GHz. The 2nd mixer outputs 2.4GHz. The 2.4GHz transmit signal is amplified with a power amplifier.The power amplifier drives a coupler/detector assembly. The Coupler /detector's function is to sample the transmit signal and rectify it. The rectified signal is proportional to the output power and is used for power leveling and control.

  The RF transmit signal then passes through a dual band switch. This switch enables the connection of the input to external antenna.

- b) Receive

  The 2.4GHz receive signal is transferred in a reverse order from the antenna through the switch. It is amplified by a low noise amplifier and fed back into MAC/BB IC.

  Frequency is changed by two steps of mixers inside IC. The 1st mixer outputs 1.6GHz. The 2nd mixer outputs base-band signal. MAC/BB IC receives in-phase and quad-phase signal from Transceiver IC.

- Digital Section

  1. MAC/BB IC(IC601)

     MAC/BB IC implements a half-duplex, Orthogonal Frequency Division Multiplexing (OFDM) base- band processor supporting IEEE802.11b/g data rate.

     It provides one MII-compatible interface.

  2. SDRAM(IC603)

     Operation power supply : +3.3V

     Memory size : 64Mbit

     Operation : It operates as a work memory of MAC/BB IC.

  3. Flash ROM (IC602)

     Operation power supply : +3.3V

     Memory size : 16Mbit

     Access time : 50ns

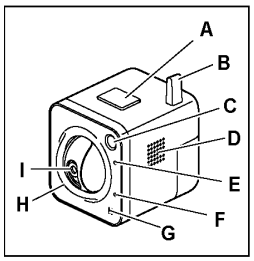
     Operation : The program for CPU operating are stored.

  4. Ethernet-PHY(IC661)

     Ethernet-PHY is connected to MAC/BB IC by MII interface. By connecting PHY on the Main Board, data is exchanged between MAC/BB IC as CPU on the Main board.

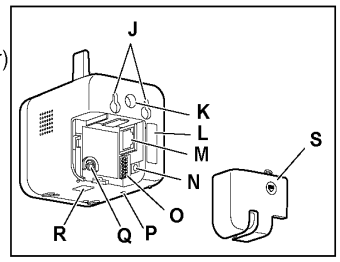
5 Location of Controls and Components

Front View



A PRIVACY button
B Antenna
C Built-in sensor (pyroelectric infrared sensor)
D Speaker (for built-in alarm)
E POWER indicator*1
F AV LINK indicator
G Microphone
H Lens cover
I Lens

Rear View



J Wall mounting holes
K Tripod mounting hole
L Serial number and MAC address label
M LAN port
N DC IN jack
O External I/O interface
P FACTORY DEFAULT RESET button
Q Safety wire hole
R WIRELESS/WIRED switch
S Cable cover

*1 See 5.1 Understanding the Camera Indicators.

5.1. Understanding the Camera Indicators

The camera's indicators light as follows according to the status of the camera. Understanding how and when the indicators light can help you troubleshoot problems with the camera.

The POWER indicator

Camera Status or Operation	Indicator Color and Pattern
Normal Operation	Green
When power is turned on (camera is starting up)	Orange→Flashing orange
Obtaining IP address via DHCP	Flashing green
LAN cable not connected or no LAN connection	Orange
Automatic Setup	Flashing green→Green
Updating firmware	Flashing orange
Factory reset (by software or by pressing the FACTORY DEFAULT RESET button)	Flashing orange→Off→(The camera restarts)
UPnP™ port forwarding error	Flashing orange (2-second intervals)
Privacy mode activated	Red
Camera failure	Flashing red

The AV LINK indicator

Camera Status or Operation	Indicator Color and Pattern
No TVs are registered to the camera	Off
The camera can communicate with at least one TV in its device list	Green
The camera cannot communicate with any of the TVs in its device list	Orange
The camera is in registration mode	Flashing orange

6 Installation Instructions

Choosing a Location to Mount the Camera

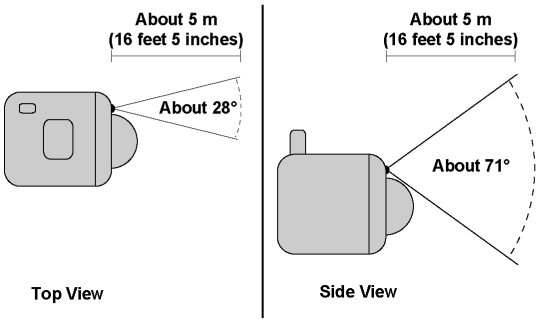
Notes About the Camera's Built-in Sensor

Please read the following information about the camera's built-in pyroelectric infrared sensor before deciding where to mount the camera. **Refer to the Panasonic Network Camera website at http://panasonic.net/pcc/support/netwkcam/ for further information about the built-in sensor.**

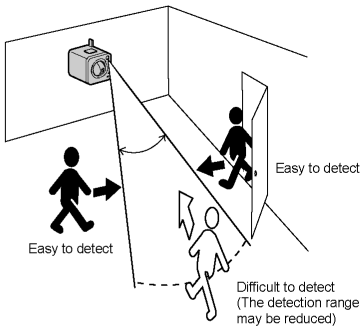
The camera's built-in sensor is a pyroelectric infrared sensor, which means it uses infrared rays to detect temperature differences within its range that are emitted naturally by people, animals, etc. The sensor can be used to trigger the camera to buffer (i.e., temporarily store) camera images in its memory. You can view these images later as desired. The sensor can also be used to trigger the camera to transfer images to someone or somewhere, by FTP, E-mail, or HTTP.

Because the detection range is easily affected by the temperature of the surrounding environment or how fast the objects in front of the camera are moving, you should take the following into consideration when deciding where to mount the camera.

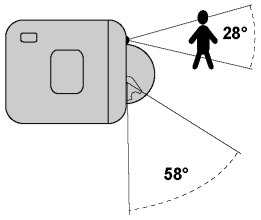
1. The sensor's active detection range is about 5 m (16 feet 5 inches) in front of the camera, about 28° horizontally, and about 71° vertically, when the camera is in a 20 °C (68 °F) environment.



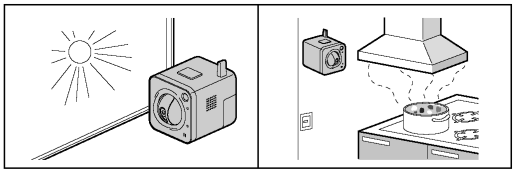
2. If an object is within about 1 m (3 feet 3 inches) of the camera, the sensor may detect the object even if it is outside of the sensor's range.
3. If there is no temperature difference between objects in range of the camera's sensor and the surrounding environment, such as on a hot summer day, the sensor may not be able to detect properly.
4. If the sensor is obstructed, the sensor is not able to make detections. Remove any obstacles in front of the sensor.
5. As shown in the illustration below, the sensor can easily detect temperature differences of objects moving sideways within the detection range, but cannot easily detect objects moving slowly towards the sensor. Mount the camera where objects often pass the camera from the sides.



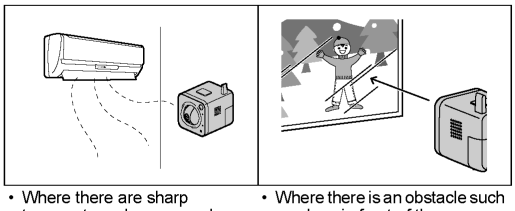
6. If the lens is aimed at an area outside of the sensor's active detection range, the objects that trigger the sensor may not be visible, and therefore buffered or transferred images may not show the object that triggered the sensor.
   In the example below, the person has triggered the sensor, but the person is not in the visible range of the camera.
   We recommend that you limit the pan and tilt range of the camera to the active detection range of the sensor, or that you limit other user's access to the pan and tilt features.



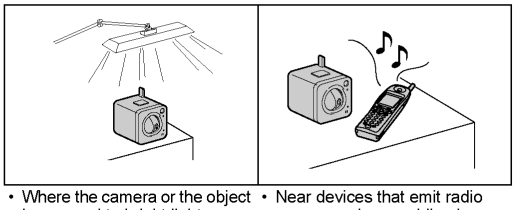
7. The sensor may not perform properly in the following areas. Avoid these kinds of locations when mounting the camera.



- Where the camera or the object is exposed to direct sunlight
- In a greasy or humid place such as a kitchen



- Where there are sharp temperature changes such as near an air conditioner
- Where there is an obstacle such as glass in front of the camera



- Where the camera or the object is exposed to bright light
- Near devices that emit radio waves, such as mobile phones

8. When deciding where to mount the camera, you can verify the sensor's ability to make detections that satisfy your needs by referring to the camera's indicator. See 7.5 Changing the Indicator Display in the Operating Instructions on the CD-ROM, and configure the camera to light the indicator in orange when the sensor makes a detection. You can then adjust the sensitivity of the sensor (see 2.9 Adjusting Sensor Sensitivity in the Operating Instructions on the CD-ROM) or change the camera's location if necessary. Note that if you increase the sensitivity of the sensor, the sensor may make inaccurate detections.

Note

- If you are not satisfied with the sensor's ability to make detections, we recommend using the camera's motion detection feature. This feature detects motion by detecting changes in the camera image. For more information, see Section 2 Using Triggers to Buffer and Transfer Images in the Operating Instructions on the CD-ROM.
- The built-in sensor and the motion detection feature are not designed to be used for security or surveillance. No responsibility will be taken by our company with respect to consequences resulting from the use of these features.

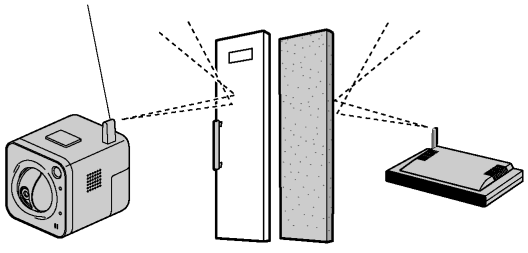
Notes About Wireless Communication

The radio wave range may decrease depending on the surrounding environment or existence of obstacles. If obstacles such as the following are placed between a camera and a router, radio waves will weaken. Therefore, even if the distance between the camera and router is short, the frame rate may decrease or images may not be displayed.

- A metallic door or shutter
- A wall with an insulation material that contains aluminum foil
- A wall made of tin
- A wall made of concrete, stone or brick
- Fireproof glass
- Several walls separated by open space
- A steel shelf

In the example below, wireless communication between the camera and the wireless router is impaired due to steel doors or reinforced concrete walls between the camera and the wireless router.

Position the camera away from obstacles such as steel doors or reinforced concrete walls.



Mounting the Camera

•The camera illustrations in this document depict the BL-C230A.

Caution

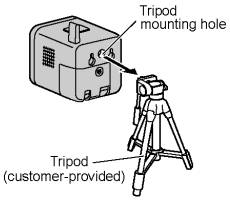
- Do not drive the screws into a soft material. Drive the screws into a secure area of the wall, such as a wall stud, otherwise the camera may fall and be damaged.
- Make sure you attach the safety wire when mounting the camera, to prevent the camera from falling.

Note

- Use screws that are appropriate for the material of the wall.
- The included screws are for use with wooden walls only.
- The pull-out strength of the installation area must be at least 294 N (30 kgf) per screw.
- The camera is intended for indoor use only and should not be mounted outdoors.
- To ensure that camera images are displayed properly, do not mount the camera on an incline. Mount the camera so that it is perpendicular to the floor. Do not mount the camera upside down.

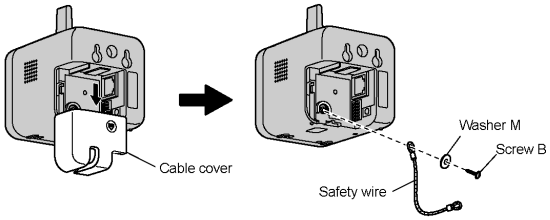
Tripod Mount

- Do not use a tripod screw with a thread of 6 mm (1/4 inch) or more. This may damage the tripod mounting hole.
- The camera cannot be mounted depending on the shape of the camera platform.

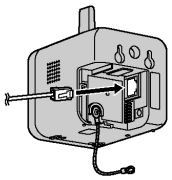


Wall Mount

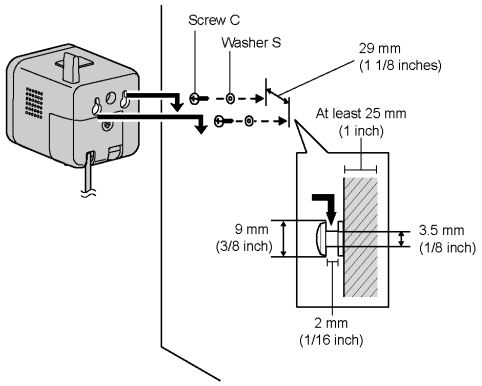
1. Remove the cable cover, secure the safety wire to the camera using screw B (included) and washer M (included).
   - Make sure you attach the safety wire when mounting the camera, to prevent the camera from falling.



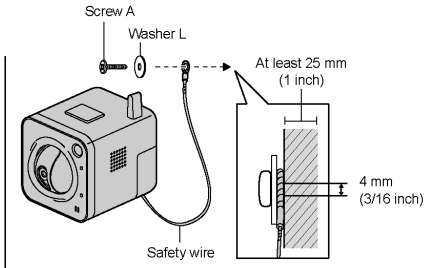
2. Connect a LAN cable to the camera and attach the cable cover.
   - Insert the LAN cable until it clicks into to place.



3. Mount the camera on the screws by inserting the screws into the camera's wall mounting holes, then sliding the camera down until it is secure.
   •Leave 2 mm (1/16 inch) of space between the screw heads and the washers, as shown below.



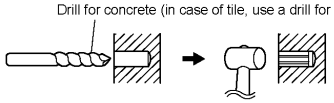
4. Secure the safety wire to the wall using screw A (included) and washer L (included).
   - Leave some slack in the safety wire, as shown.
   - Attach the safety wire in a position so that if the camera were to become detached, it would not fall on nearby people.



When mounting on a mortar or concrete surface

- Prepare anchors for a 4 mm (3/16 inch) diameter screw for the safety wire, and 3.5 mm (1/8 inch) diameter screws for the wall mounting.

1. Mark the points where you are going to make holes.
2. Make holes with an electric drill. Insert anchors (customer-provided) into the holes and use a hammer to make them flush with the wall.
   - Mortar walls break easily when drilling. Be careful of pieces of mortar which may become loose and fall.



3. Mount the camera by following the instructions on this page.
4. Mark the point where you are going to make a hole for the safety wire, follow step 2 and secure the safety wire.

7 Operating Instructions

7.1. Preparation

Prepare the following before connecting the Network Camera.

- Set up software (Setup CD-ROM)
- PC to fulfill the system requirements.
- Ethernet Router for LAN Connection.
- Ethernet cable (two pieces of Category 5 straight cable).

System Requirements

Your PC and network must meet the following technical specifications in order for the camera to function properly.

Item	Requirement
Operating System	Microsoft® Windows Vista®, Windows® XP Service Pack 2 or later
CPU	3.2 GHz Pentium® 4 or faster (2.13 GHz Intel® Core™ 2 Duo or faster when viewing the multi camera page)
RAM	512 MB or more; 1 GB or more recommended (1 GB or more recommended when viewing the multi camera page)
Video RAM	256 MB or more
Display	1024 x 768 resolution or higher
Protocol	**For IPv4 Connection** TCP/IP protocol (HTTP, TCP, UDP, IP, DNS, ARP, ICMP) **For IPv6 Connection*1** TCP/IP protocol (HTTP, TCP, UDP, IP, DNS, ICMPv6, NDP)
Interface	10/100 Mbps network card
Wireless Interface	IEEE 802.11b/g (Embedded)
Web Browser	Internet Explorer® 6, Internet Explorer 7, Internet Explorer 8
Audio	PC speaker or headphones (required to use the Listen feature)
Additional Software (For Viewing Buffered MPEG-4 Images)	**For Windows Vista** Windows Media® Player 11 or later **For Windows XP** Windows Media Player 9 or later

*1) **What is IPv6?**

・IPv6 is short for “Internet Protocol Version 6”.

・IPv6 was created to provide the additional IP addresses that will be needed as the Internet continues to expand.

・IPv6 is expected to gradually replace IPv4, with the 2 coexisting for a number of years during a transition period.

・ Though most ISPs (Internet Service Providers) do not yet support IPv6, many local networks already use it. When your ISP supports IPv6, your Panasonic Network Camera will be ready!

・For more information, visit http://www.ipv6.org/.

Note:

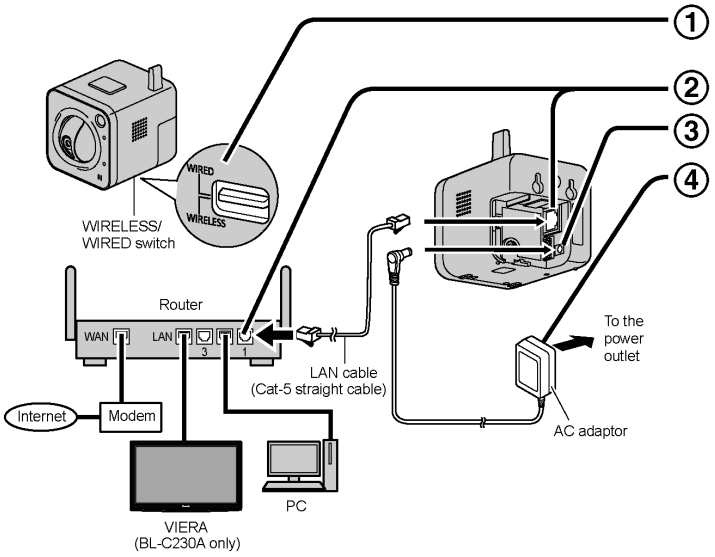
Refer to the Panasonic Network Camera website at **http://panasonic.net/pcc/support/netwkcam/** for details about network environment.

7.2. Connection

Connections

Connect the camera to your router and to the power outlet as described below.

- Before proceeding, confirm that your PC is connected to your router and can access the Internet. Also confirm that your router's UPnP™ feature is enabled. (Most routers have UPnP™ turned off by default.) Refer to the operating instructions included with your router or to the Panasonic Network Camera website (http://panasonic.net/pcc/ipcam/) for more information.



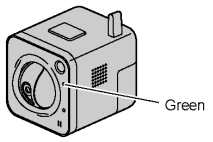
① Confirm that the WIRELESS/WIRED switch on the bottom of the camera is set to **WIRED**.

② Connect the LAN cable to the camera and the router.

③ Connect the AC adaptor cord to the DC IN jack.

④ Plug the AC adaptor into the power outlet.

- Confirm that the indicator turns green after about 1 minute. If it does not turn green, see 1.2 POWER Indicator Issues in the Troubleshooting Guide on the CD-ROM.



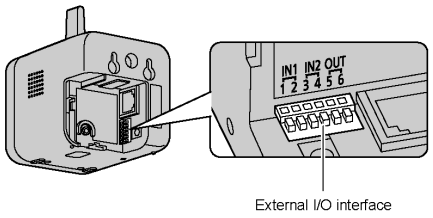
- When you operate the camera, the power outlet should be near the camera and easily accessible.
- Use only specified Panasonic AC adaptor (Order No. PQLV206Y)
- The camera may become warm. This is normal.

After the camera's indicator turns green, you may set up the camera. Continue by following the procedure described in the included Setup Guide.

- If the indicator does not turn green, see 1.2 POWER Indicator Issues in the Troubleshooting Guide on the included CD-ROM.

Connecting External I/O interface

The camera's external I/O interface allows you to connect a device, such as a sensor or motion detector, that can be used to trigger the camera's image buffering and transferring features (see Section 2 Using Triggers to Buffer and Transfer Images in the Operating Instructions on the CD-ROM), as well as the detection notification sound feature (see Section 1.2.11 Additional Features Available While Viewing Live Camera Images in the Operating Instructions on the CD-ROM).

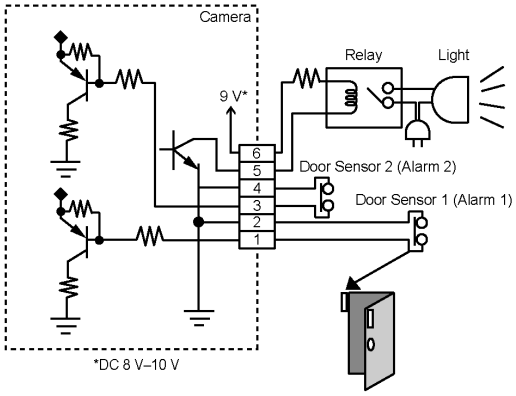


Terminal		Description
IN1	1	External sensor input. The camera can be triggered by either an open circuit or a GND short-circuit.
	2	GND terminal.
IN2	3	External sensor input. The camera can be triggered by either an open circuit or a GND short-circuit.
	4	GND terminal.
OUT	5	External device control output. Allows you to control an external device using the output buttons in the camera's operation bar (for example, turning a light on or off). • This terminal's behavior can be changed (see 7.4 Controlling the External Output Terminal (BL-C230 Only) in the Operating Instructions on the CD-ROM). • This terminal is an open collector circuit. The maximum drawing current is the same as terminal 6. Do not exceed the voltage of terminal 6.
	6	DC power output terminal. • DC 8 V–10 V • Maximum load is 100 mA.

Note

- If excessive force is used when disconnecting wires with pointed objects from the external I/O interface, terminals may become damaged or the interface may be pushed inside the camera body and become unusable.

Circuit Diagram Example



Caution

- The external I/O interface is not capable of connecting directly to devices that require large amounts of current. In some cases, a custom interface circuit (customer-provided) may have to be used. Serious damage to the camera may result if a device that exceeds its electrical capability is connected to the external I/O interface.
- Low voltage/current circuits and high voltage/current circuits are used in the camera circuit. All wiring should be performed by a qualified electrician. Incorrect wiring could damage the camera and cause a fatal electric shock.
- External devices connected to the camera's output terminals cannot be controlled in the event of a network error or failure. Keep this in mind when connecting door locks, heat-emitting devices, or other devices that may be dangerous if they cannot be controlled.

7.3. Setup Guide

1. Insert the included CD-ROM into your PC.

- The Setup Program starts. If the program does not start, double-click Setup.exe found on the CD-ROM.

2. Click [Search for Cameras].

- The program searches for cameras connected to your network.

- **[About this program]:** Displays the program's version information.
- **[Search for Cameras]:** Displays a list of cameras connected to your network.
- **[Manual]:** Allows you to view the included documentation. PDF versions of the printed documentation are included on the CD-ROM; Adobe® Reader® is required to view them.
- **[Update Firmware]:** Allows you to use the Setup Program to update the camera's firmware (built-in software).
- **[Save Settings to PC/Save Settings to Camera]:** Allows you to save a backup of all camera settings on your PC, or restore all settings in the camera using a backup file saved on your PC.
- **[Network Camera Recorder with Viewer Software Single Camera Version Installation] / [Network Camera Recorder 16 Cameras Version Installation]:** Installs the [Network Camera Recorder with Viewer Software Single Camera Version] / [Network Camera Recorder 16 Cameras Version] software. (See "Installing the Network Camera Recorder with Viewer Software Single Camera Version / Network Camera Recorder 16 Cameras Version" on page 2.)
- **[Exit]:** Closes the screen and exits the Setup Program.

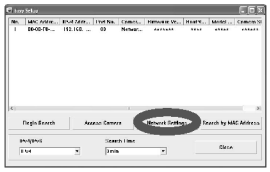
If [Windows cannot open this file] is displayed after clicking [Manual]
[Select the program from a list]→[OK]→Check [Always use the selected program to open this kind of file]→[Browse]→Browse to [C:\WINDOWS\system32\mshta.exe]→[Open]→[OK]

3. When the Windows Security Alert is displayed, click [Unblock].

- If the dialog is not displayed, continue to the next step.

4. For BL-C210A/BL-C230A Only: If the camera is connected to a router, follow the procedure below and set [Network Settings] to [Automatic Setup].

1. Select the desired camera and click [Network Settings].
2. In the [Network Settings] screen, select [Automatic Setup], then click [Save].
   - The camera restarts.
3. When [Camera setup completed] is displayed, click [OK].
4. Wait about one minute, then click [Begin Search].



- If you have more than one camera, you can distinguish cameras by model number, printed on the front of the camera, or by MAC address (this refers to the MAC address label on the camera).
- If more than 20 minutes have passed since the selected camera was turned on, you cannot configure the camera. Turn off the camera, then turn it on again. This restriction does not apply to cameras which have not been configured yet or have been reset to their factory default settings.

5. Select the camera you want to configure, and click [Access Camera].

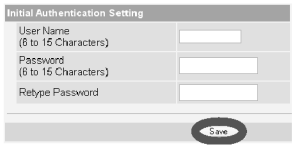
- To assign all network settings to the camera manually or to assign an IP address using the DHCP or the Automatic feature of your router, click [Network Settings], then select [Specify an IP Address], [DHCP] or [Automatic Setup] and enter the appropriate settings.

- If you have more than one camera, you can distinguish cameras by model number, printed on the front of the camera, or by MAC address (this refers to the MAC address label on the camera).
- If more than 20 minutes have passed since the selected camera was turned on, you cannot configure the camera. Turn off the camera, then turn it on again. This restriction does not apply to cameras which have not been configured yet or have been reset to their factory default settings.

- If you are using firewall or antivirus software on your PC, the Setup Program may not be able to find any cameras on your network. If you cannot disable your firewall or antivirus software, you can configure the camera by entering its MAC address (this refers to the MAC address label on the camera).

6. Enter the desired user name and password, then click [Save].

- Do not forget the user name and password you set here, otherwise you will need to reset the camera and configure it again.



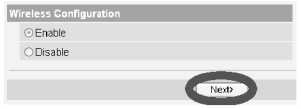
If you are using a French, German, Italian, Spanish, Russian, Simplified Chinese, or Japanese language OS, this screen will be displayed in the corresponding language, and all subsequent camera screens will be displayed in that language.

7. Enter the user name and password, then click [OK].

- When the user name and password dialog is displayed, enter the user name and password used in step 6, and then click [OK].

8. For BL-C230 Only: Click [Next] to configure the camera's wireless settings, enter the wireless settings, then click [Save].

- These settings are not available for the BL-C210, continue to the next step.
- If you are not using a wireless connection, select [Disable] and then click [NEXT] to skip this step.



Access your wireless router and display its wireless settings. If your wireless router is not configured to use encryption, there is a risk of unauthorized access to your network and data. Enabling encryption is strongly recommended; WPA-PSK (TKIP) or WPA2-PSK (AES) are particularly recommended (they are offer more security than WEP encryption). Note that when the router's wireless settings are changed (including encryption settings), wireless network settings for all devices that connect to the router wirelessly must also be changed. For information on changing settings, refer to the operating instructions included with your wireless router and network devices. Match the camera's wireless settings to the router's settings. For more information, refer to:

- Operating instructions included with your wireless router
- 5.3.1 Configuring the Camera for Wireless Connection (BL-C230 Only) in the Operating Instructions on the CD-ROM
- Panasonic Network Camera website http://panasonic.net/pcc/support/netwkcam/technic/wireless/cam_set.html

9. When [Setup completed] is displayed, click [To Single Camera page].

The camera's IP address is displayed. This is the IP address you must enter in your web browser to access the camera. Do not forget this address.

- If the following ActiveX® Controls dialog is displayed, click [Install ActiveX Control...].

•When the following Security Warning is displayed, click [Install].

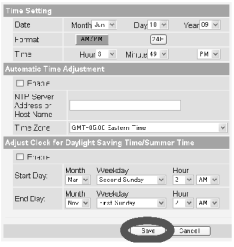
This will install the viewer program (ActiveX Controls) needed to display camera images properly. Viewer programs must be installed to view H.264 images, MPEG-4 images, MJPEG images, and to use audio features.

- The camera image is displayed.

Congratulations! You have successfully set up the camera and can now view camera images.

- Screen content varies by model number.

10. Click the [Setup] tab, click [Date and Time] on the left side of the screen, then set the camera's date and time. Click [Save] when finished.



For more information, refer to 5.5 Setting the Date and Time in the Operating Instructions on the CD-ROM.

- Screen content varies by model number.

Setup is complete. To configure the camera for access from the Internet, see "Access from Internet Configuration". To confirm the camera's wireless connection (BL-C230 only), see "Confirming Wireless Connection (BL-C230 Only)".

If you are finished setting up the camera, return to the Installation Guide and follow the instructions for mounting the camera.

Access from Internet Configuration

To configure the camera for access from the Internet or from a mobile phone, continue with the following steps.

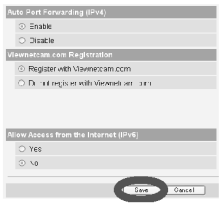
Note:

- In order to configure the camera for access over the Internet using these instructions, your router must be UPnP™ compatible and must have its UPnP™ feature turned on (it is turned off by default on most routers). For more information, refer to the operating instructions included with your router.
- To configure the camera for access over the Internet using a router that does not support UPnP™, refer to Section 4 Configuring the Camera for Access from the Internet in the Operating Instructions on the CD-ROM for general information, and refer to the operating instructions included with your router.
- Disable the maximum idle time setting on your router if you have a PPPoE or PPTP connection to your Internet Service Provider.

1. Click the [Internet] tab at the top of the camera screen.

2. Select [Enable] under [Auto Port Forwarding (IPv4)], select [Register with Viewnetcam.com] under [Viewnetcam.com Registration], then click [Save].

- When the dialog about the camera's port number changing is displayed, click [OK].
- The camera and router will begin configuring themselves via UPnP™.
- If you select to register with Viewnetcam.com, click [Go to Viewnetcam.com Registration page] when it is displayed. The Viewnetcam.com website will open automatically. Follow the on-screen instructions to register.



If you are interested in accessing your camera over the Internet, we recommend using Viewnetcam.com. Viewnetcam.com is a Dynamic DNS service designed for use with Panasonic Network Cameras, and is provided free of charge. **For more information about Viewnetcam.com, refer to the Viewnetcam.com website (http://www.viewnetcam.com) for information about this service.**

3. When [Auto Port Forwarding setup is complete.] is displayed, click [To Single Camera page].

The camera's IP addresses for local (LAN) and Internet access are displayed. These are the IP addresses you must enter in your web browser to access the camera over the LAN or from the Internet. Do not forget these addresses.

- If you enabled [Auto Port Forwarding (IPv4)], the camera's port number may have changed. Do not forget the addresses displayed here.
- To confirm that the camera can be accessed from the Internet using a PC, use a PC not connected to your network and access the camera using the address displayed here.
- The IP address or URL used to access the camera over the Internet will also be displayed on the [Status] page of the [Maintenance] tab.

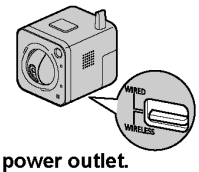
Setup is complete. To confirm the camera's wireless connection (BL-C230 only), see "Confirming Wireless Connection (BL-C230 Only)".
If you have any difficulty accessing the camera or viewing camera images, refer to the Troubleshooting Guide on the CD-ROM, otherwise return to the Installation Guide and follow the instructions for mounting the camera.

Confirming Wireless Connection (BL-C230 Only)

After configuring the camera's wireless settings, confirm that the camera can be accessed wirelessly.

1. Disconnect the LAN cable from the camera, and unplug the AC adaptor from the power outlet.

2. Set the WIRELESS/WIRED switch on the bottom of the camera to WIRELESS.



3. Plug the AC adaptor in to the power outlet.

- Confirm that the indicator lights green after about 1 minute. If the indicator does not light green, see 1.2 POWER Indicator Issues in the Troubleshooting Guide on the CD-ROM.

4. Start your web browser and access the camera.

- Enter camera's IP address that was displayed during setup, then press [Enter] on the keyboard.
- If you cannot access the camera, see 1.4 Wireless Connection Issues (BL-C230 Only) in the Troubleshooting Guide on the CD-ROM.
- You may need to restart your router in order to access the camera in wireless mode.

If you are finished setting up the camera, return to the Installation Guide and follow the instructions for mounting the camera.

Installing the Network Camera Recorder with Viewer Software Single Camera Version / Network Camera Recorder 16 Cameras Version

The CD-ROM includes a single camera version of the Panasonic Network Camera Recorder with Viewer Software and a 16 cameras version of the Network Camera Recorder. Click [Manual] on the Network Camera Setup Program window for details about the installation and operation of these software.

1. **Insert the included CD-ROM into your PC.**
   - The Setup Program starts. If the program does not start, double-click Setup.exe found on the CD-ROM.
2. **Click [Network Camera Recorder with Viewer Software Single Camera Version Installation] / [Network Camera Recorder 16 Cameras Version Installation].**
3. **Follow the on-screen instructions to install the software.**
4. **When installation is complete, double-click the shortcut icon (shown below) on your desktop to start the software.**

: Network Camera Recorder with Viewer Software Single Camera Version

: Network Camera Recorder 16 Cameras Version

Note:

- Network Camera Recorder with Viewer Software Single Camera Version is compatible with Microsoft® Windows Vista®, Windows® XP and Windows Server® 2003.
- Network Camera Recorder 16 Cameras Version is compatible with Microsoft® Windows® XP Professional Edition and Windows 2000 (Service Pack 2 or later).
- **Network Camera Recorder with Viewer Software Single Camera Version:** Camera registration is limited to one camera.
  Network Camera Recorder 16 Cameras Version: Camera registration is limited to 16 cameras.
- Supports are not provided for the single camera version and the 16 cameras version of these software.
- The single camera version and the 16 cameras version software do not support H.264 images and MPEG-4 images.

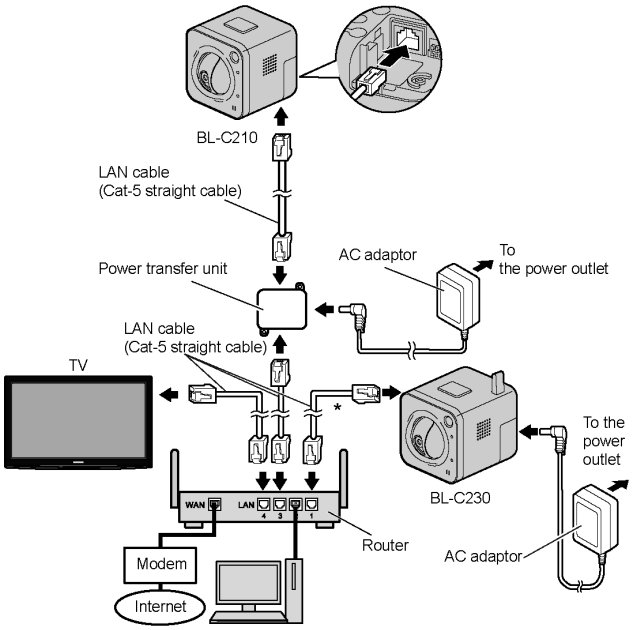
7.4. Setup Guide (for VIERA connection)

Preparation

Before registering the camera to the TV, confirm that the camera is compatible with your TV (see above).
Next, make sure the TV's software is up-to-date. Use the TV's VIERA CAST™ feature and update the software if necessary. For more information about VIERA CAST™, refer to the operating instructions included with your TV.
For customer service, refer to the information in the Customer Service Directory (for U.S.A. and Puerto Rico) or the Limited Warranty (for Canada) found in the operating instructions included with your TV.

Connections

Detailed connection instructions are described in the Installation Guide. Refer to the Installation Guide and the illustration below and connect the camera to the TV.
If you have already connected the camera as described in the Installation Guide, connect the TV to your network by connecting it to an available LAN port of your router.

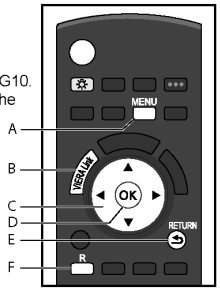


* If the camera and router are already connected wirelessly, a wired connection is not necessary.

Once the camera and TV are connected to the network, register the camera to the TV.

Using the remote control

Use the remote control included with your TV to register the camera to the TV, operate the camera, and configure the camera.
The remote control shown here is included with the TC-P42G10. For information on using your TV's remote control, refer to the operating instructions included with your TV.



A [MENU]: Displays the TV's or the camera's menu.
B [VIERA Link]: Displays the [VIERA Link] menu.
C Navigator button: Press [D], [C], [F], and [E] to navigate menus and aim the camera's lens.
D [OK]: Activates the selected item.
E [RETURN]: Returns to the previous menu.
F [R]: Can be used to find cameras on the network.

Registration

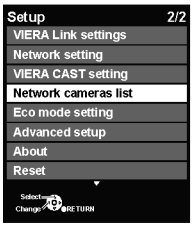
The camera can be registered to up to 4 devices (TVs), and up to 8 devices (cameras) can be registered to the TV. If registering multiple cameras to a TV, register each camera one at a time.
Before you begin, make sure the camera and TV are turned on.

1. Press the [MENU] button.

- The TV's menu is displayed.

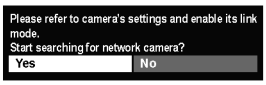
2. Press [D] or [C] to select [Setup], then press the [OK] button.

3. Select [Network cameras list], then press the [OK] button.



This item may be on the second screen of the [Setup] menu. Scroll down until [Network cameras list] is displayed.

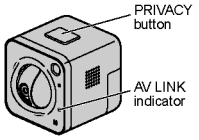
If no cameras are registered to the TV:
A message is displayed prompting you to begin searching for cameras.



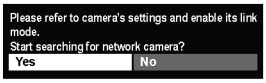
If a camera is already registered to the TV:
The network camera list is displayed. Press the [R] (red) button to register another camera. Up to 8 cameras can be registered to the TV.

4. Press and hold the camera's PRIVACY button for about 3 seconds, until the AV LINK indicator flashes.

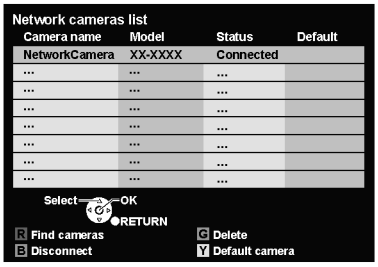
The camera illustrations in this document depict the BL-C210.
If the POWER indicator lights in red, the camera's privacy mode feature has been activated. Press the PRIVACY button to deactivate privacy mode, then press and hold the PRIVACY button for about 3 seconds.
AV LINK indicator flashes orange in the registration mode.
Complete the next step within 5 minutes.



5. Select [Yes], then press the [OK] button.

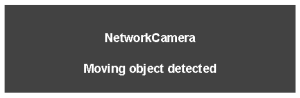


The TV will search for cameras that are available for registration.
Afterthe camera is registered, it is displayed in the network camera list.



If the camera detects motion

If the camera's heat sensor and motion sensor features detect motion, the following message is displayed on the screen.



Press the [OK] button to display the camera image, or press the [RETURN] button to cancel the message. Once a sensor is triggered, sensor features will be inactive for 60 seconds by default. Refer to the Operating Instructions (for VIERA Connection) on the included CD-ROM for more information on using and configuring the camera's sensor features.

Confirmation

Use the remote control included with your TV to view camera images on your TV.

1. Press the [VIERA Link] button.

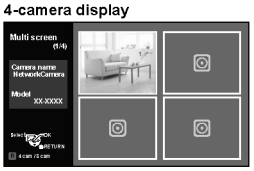
The [VIERA Link] menu is displayed.

2. Press [D] or [C] to select [Network Camera], then press the [OK] button.

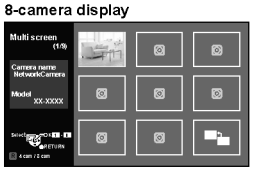
- Still images (JPEG) from up to 4 or 8 connected cameras registered to the TV are displayed on the multi screen.

Press the [R] (red) button to switch between 4-camera and 8-camera display.

4-camera display

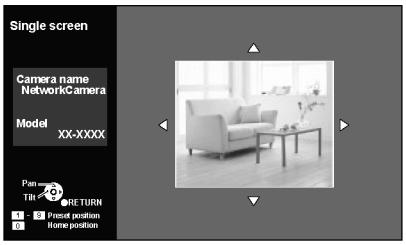


8-camera display



3. Select the desired camera, then press the [OK] button.

Live images from the selected camera are displayed.



For the camera's wireless connection, refer to the Setup Guide for wireless settings after completing registration and confirmation (BL-C230 only).

Panning and tilting the lens

To pan or tilt the camera lens while viewing the single screen, press [F], [E], [D], or [C].
You can aim the lens at pre-programmed positions called presets. You can register up to 8 presets. Presets 1-4 are registered by default. To aim the camera lens at a preset position, press the corresponding number button on the remote control ([1] to [8]). For information on changing the presets or adding additional presets, refer to the Operating Instructions (for VIERA Connection) on the included CD-ROM.
You can aim the lens at the pre-programmed home position by pressing the [0] button. The home position is the position the camera lens aims at when the camera is turned on.

If [PRIVACY] is displayed

If [PRIVACY] is displayed, the selected camera is in privacy mode and cannot be accessed. Press the camera's PRIVACY button to turn off privacy mode.

Once you have registered the camera to the TV and confirmed that camera images can be viewed using the TV, you may disconnect the camera and install it in the location where it will be permanently used. For information on installing the camera, refer to the Installation Guide.

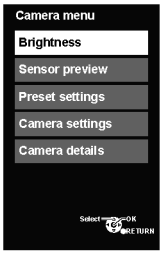
Additional Information

Configuring the camera

You can configure certain camera settings while accessing the camera with the TV.

1. While viewing camera images on the single screen, press the [MENU] button.

The camera menu is displayed.



2. Press [D] or [C] to select the desired item, then press the [OK] button to display the next screen.

Repeat this step as necessary.

3. Once the desired screen is displayed, press [F] or [E] to change the setting, then press the [OK] button to change the setting.
Press the [RETURN] button when finished to return to the menu or previous screen.

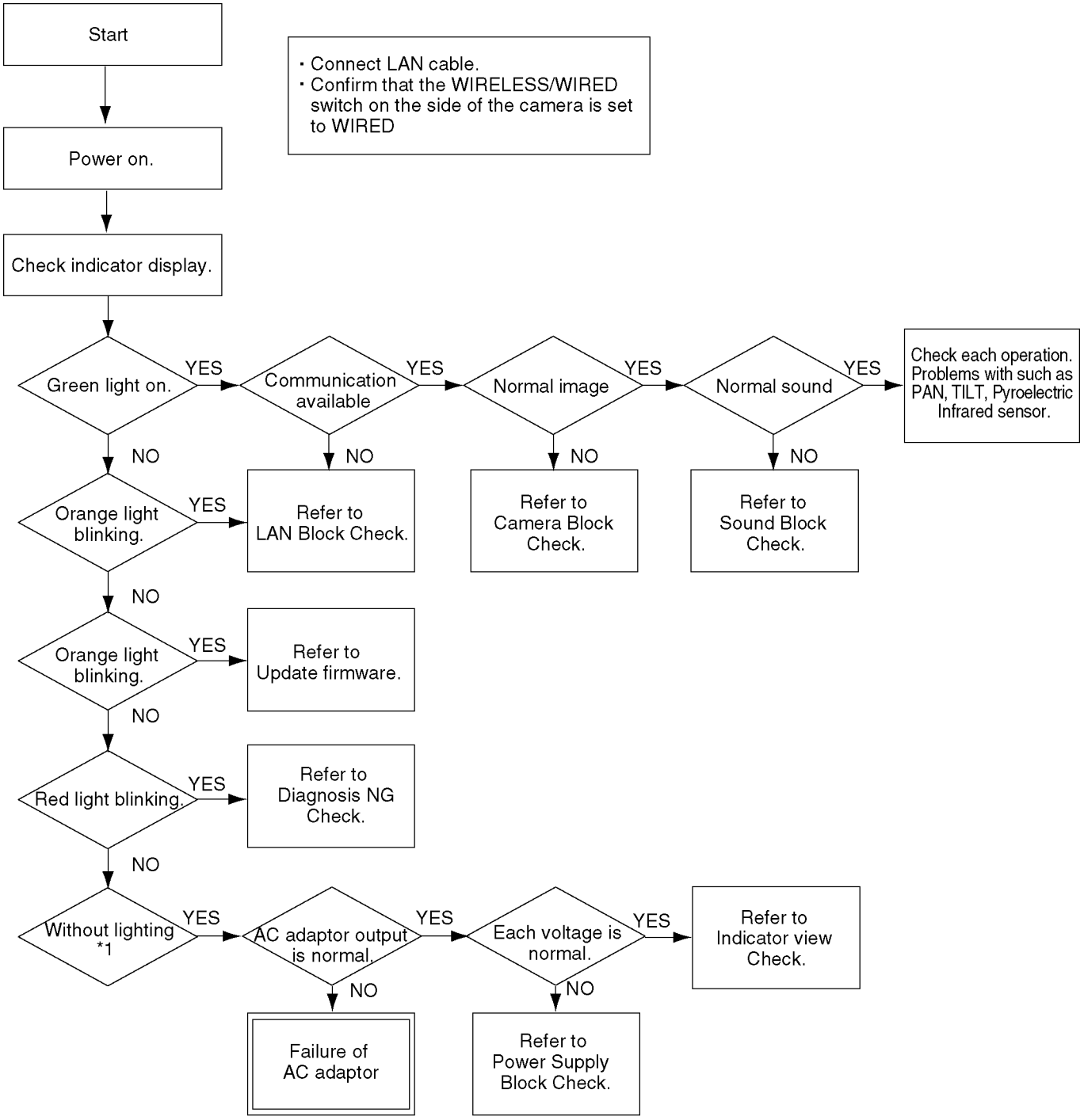
Repeat this step as necessary.

For more information

For more information on operating and configuring the camera using your TV, refer to the Operating Instructions (for VIERA Connection) on the included CD-ROM.
For information on troubleshooting issues when using the camera with your TV, refer to the Troubleshooting Guide (for VIERA Connection) on the included CD-ROM.

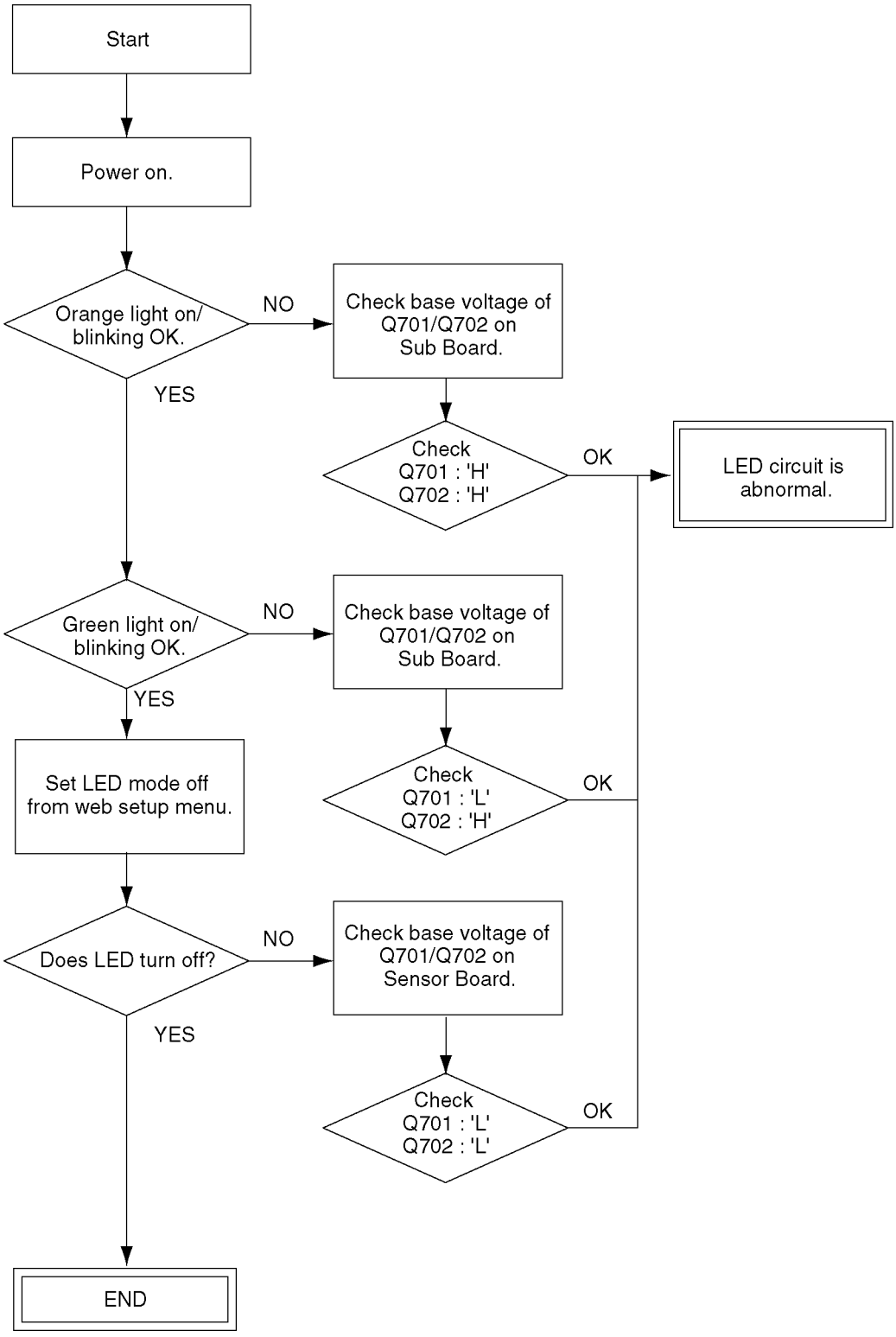
8 Troubleshooting Guide

8.1. Starting Up Operation



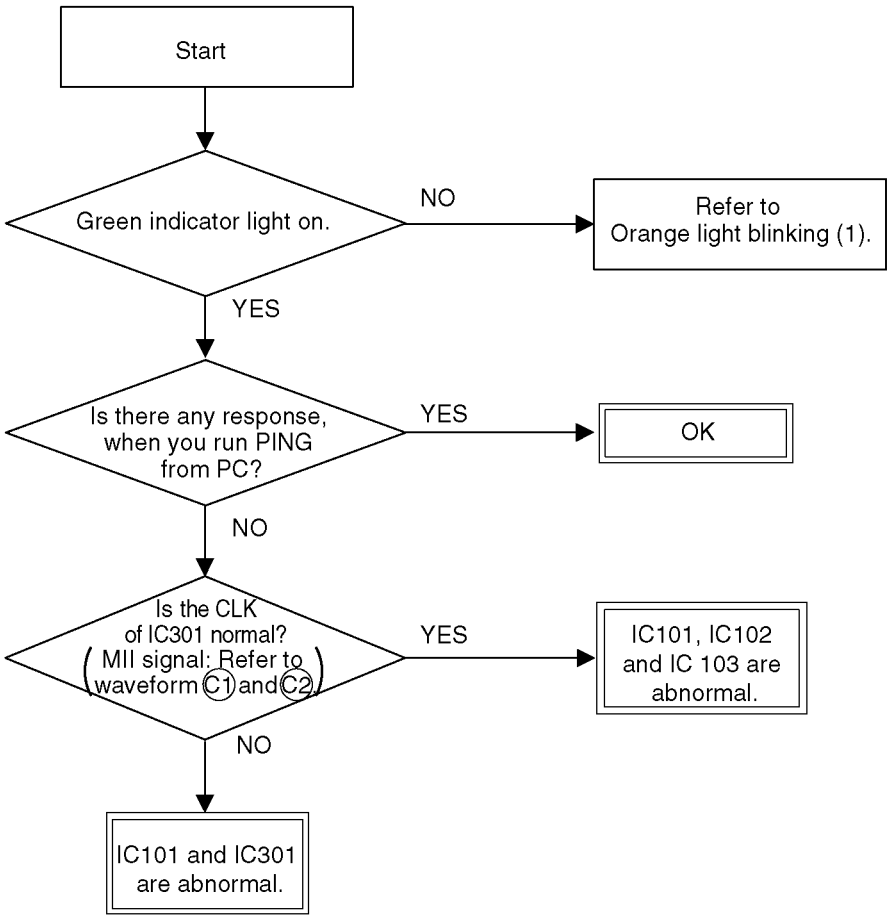
*1 It does not turn on, when LED mode is “OFF” on web setup menu.

8.2. Indicator view Check

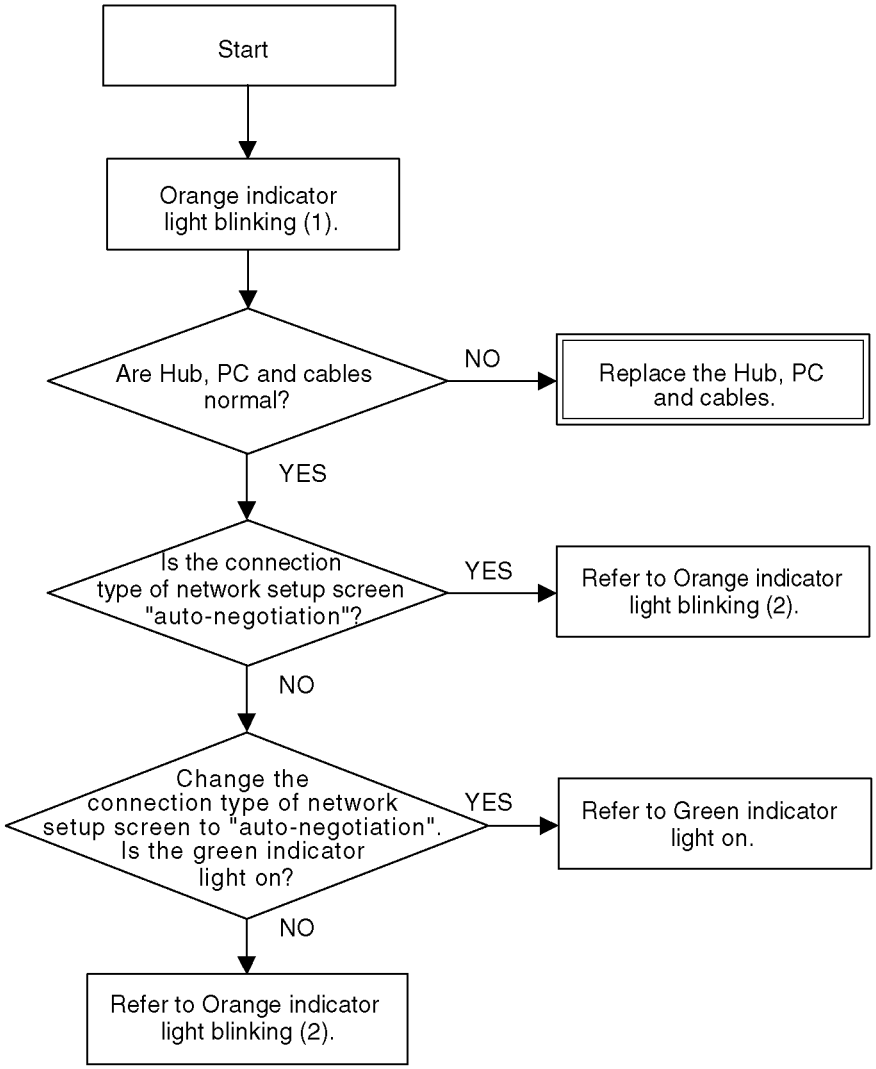


8.3. LAN Block Check

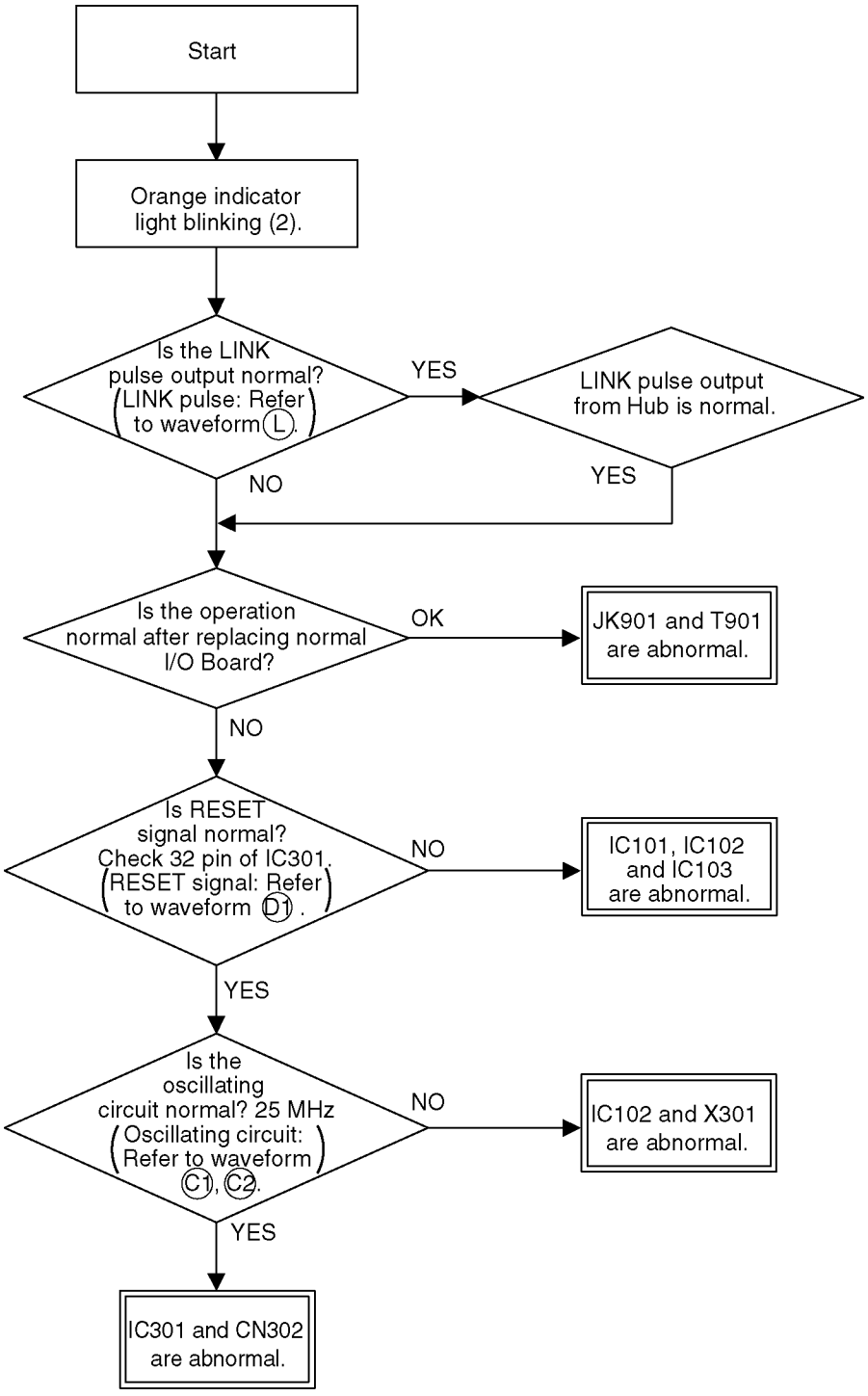
8.3.1. Green Light On



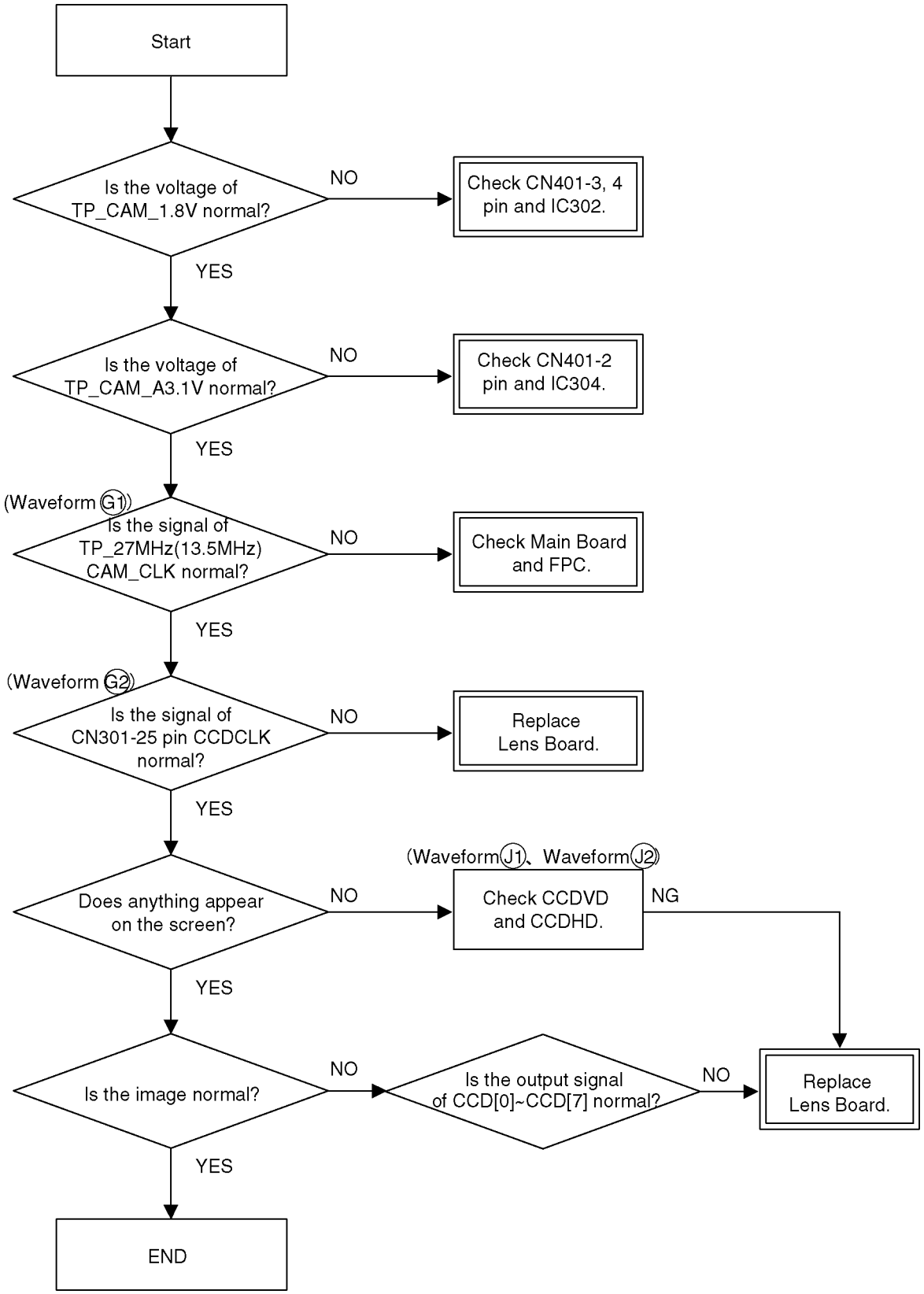
8.3.2. Orange Light Blinking (1)


Start
Orange indicator light blinking (1).
Are Hub, PC and cables normal?
NO
Replace the Hub, PC and cables.
YES
Is the connection type of network setup screen "auto-negotiation"?
YES
Refer to Orange indicator light blinking (2).
NO
Change the connection type of network setup screen to "auto-negotiation". Is the green indicator light on?
YES
Refer to Green indicator light on.
NO
Refer to Orange indicator light blinking (2).

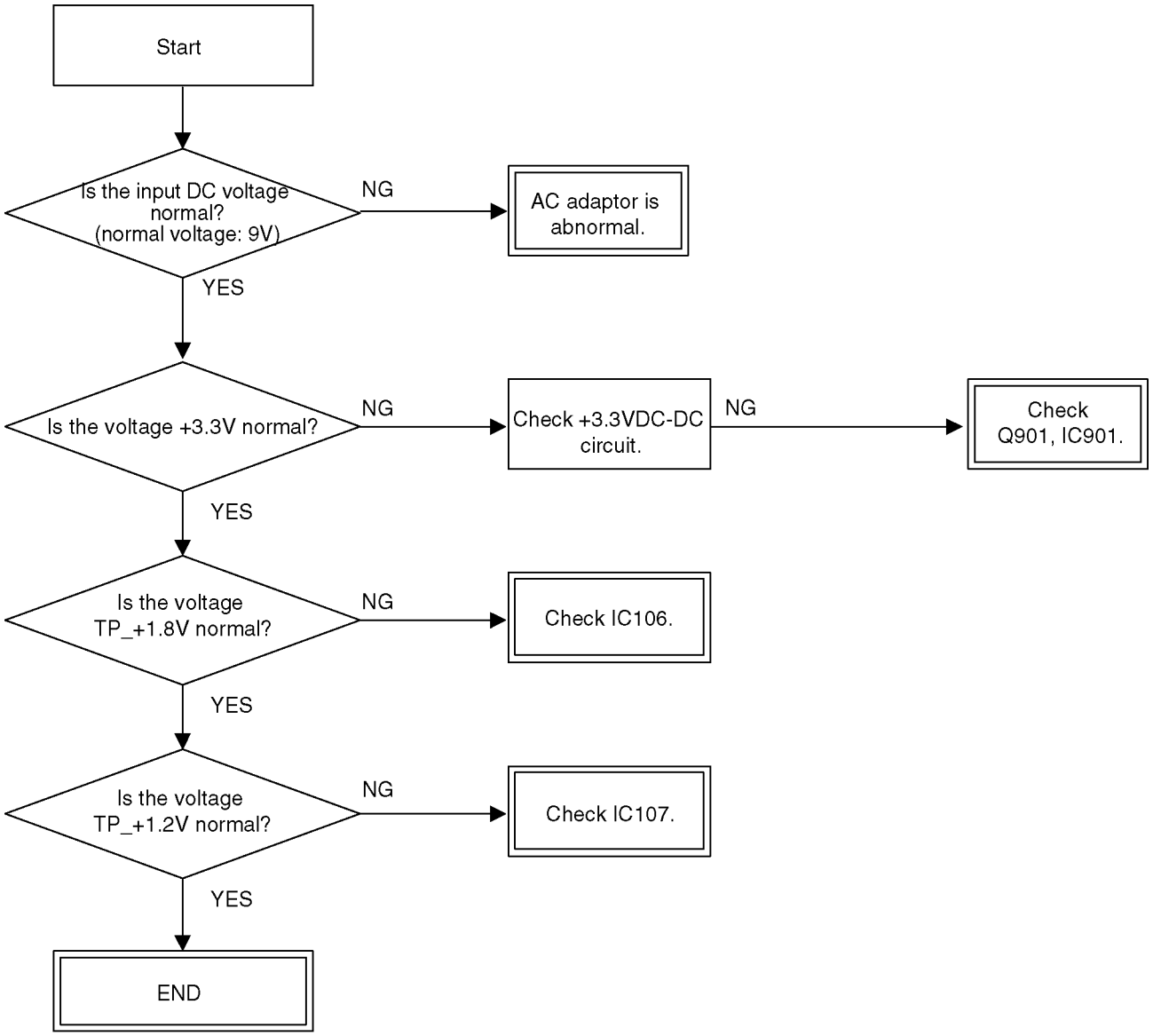
8.3.3. Orange Light Blinking (2)


Start
Orange indicator light blinking (2).
Is the LINK pulse output normal? (LINK pulse: Refer to waveform (L).
YES
LINK pulse output from Hub is normal.
YES
NO
Is the operation normal after replacing normal I/O Board?
OK
JK901 and T901 are abnormal.
NO
Is RESET signal normal? Check 32 pin of IC301. (RESET signal: Refer to waveform (D1).
NO
IC101, IC102 and IC103 are abnormal.
YES
Is the oscillating circuit normal? 25 MHz (Oscillating circuit: Refer to waveform (C1), (C2).
NO
IC102 and X301 are abnormal.
YES
IC301 and CN302 are abnormal.

8.4. LENS Block Check

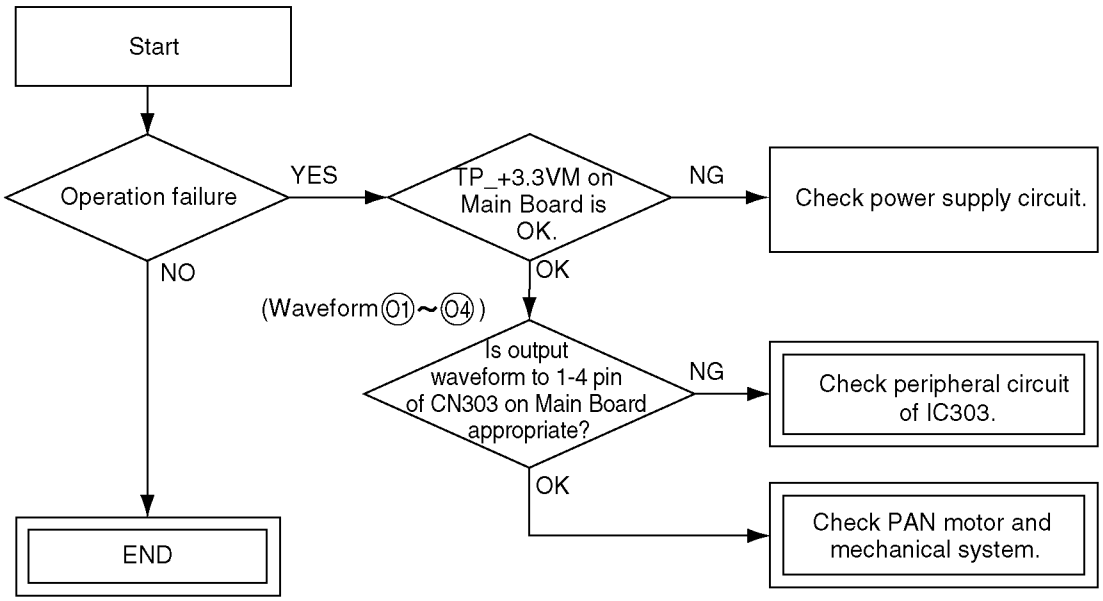


8.5. Power Supply Block Check

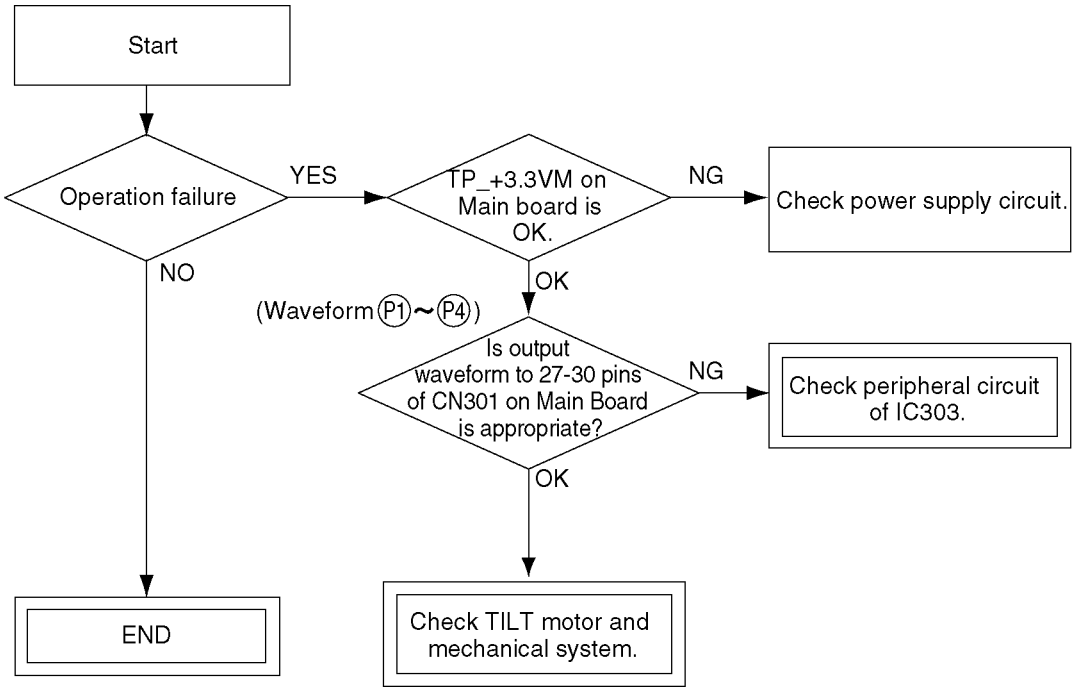


8.6. Other Operation Check

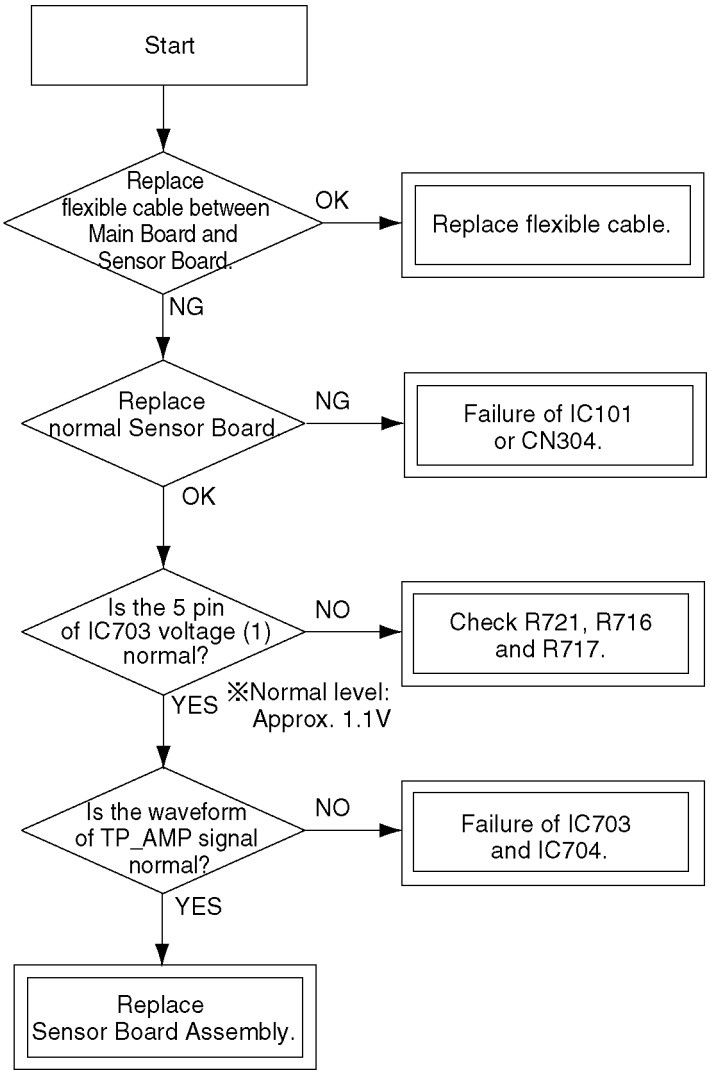
8.6.1. PAN Operation Check



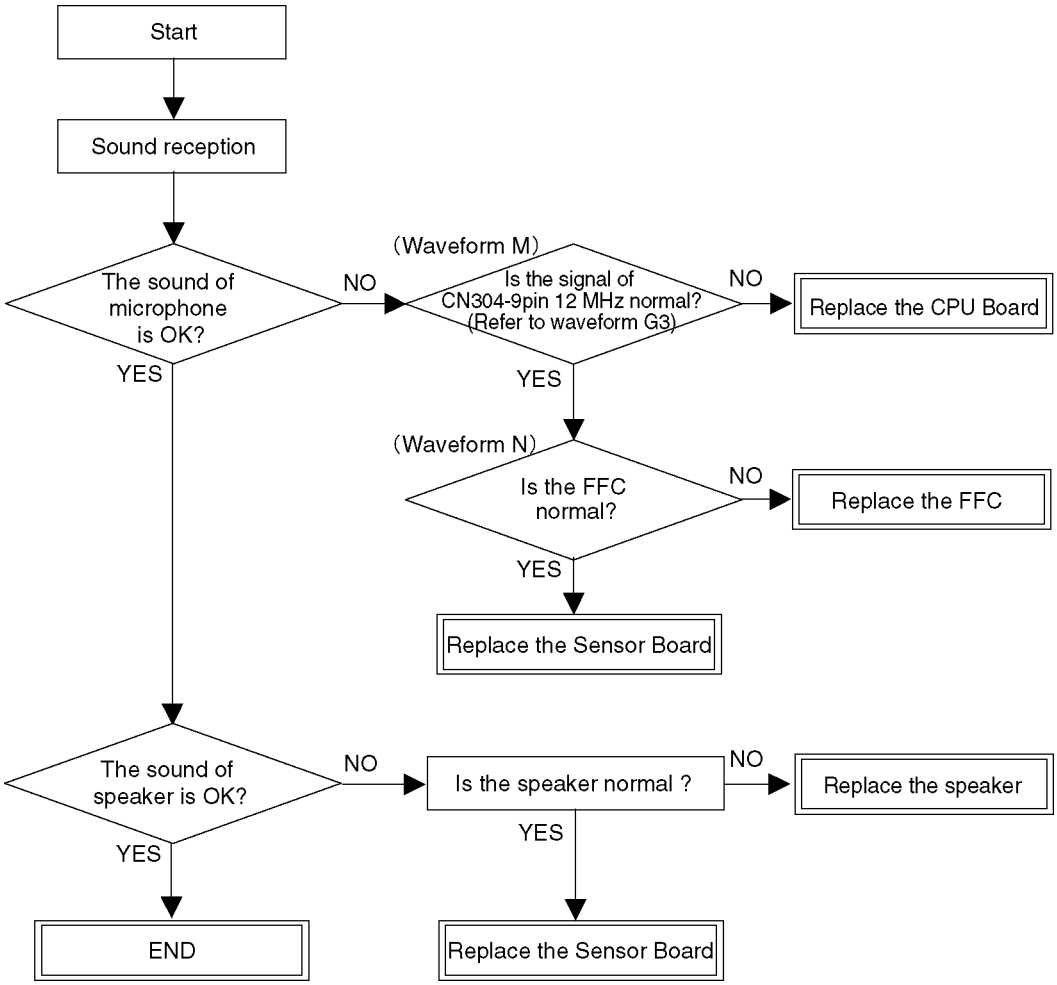
8.6.2. TILT Operation Check



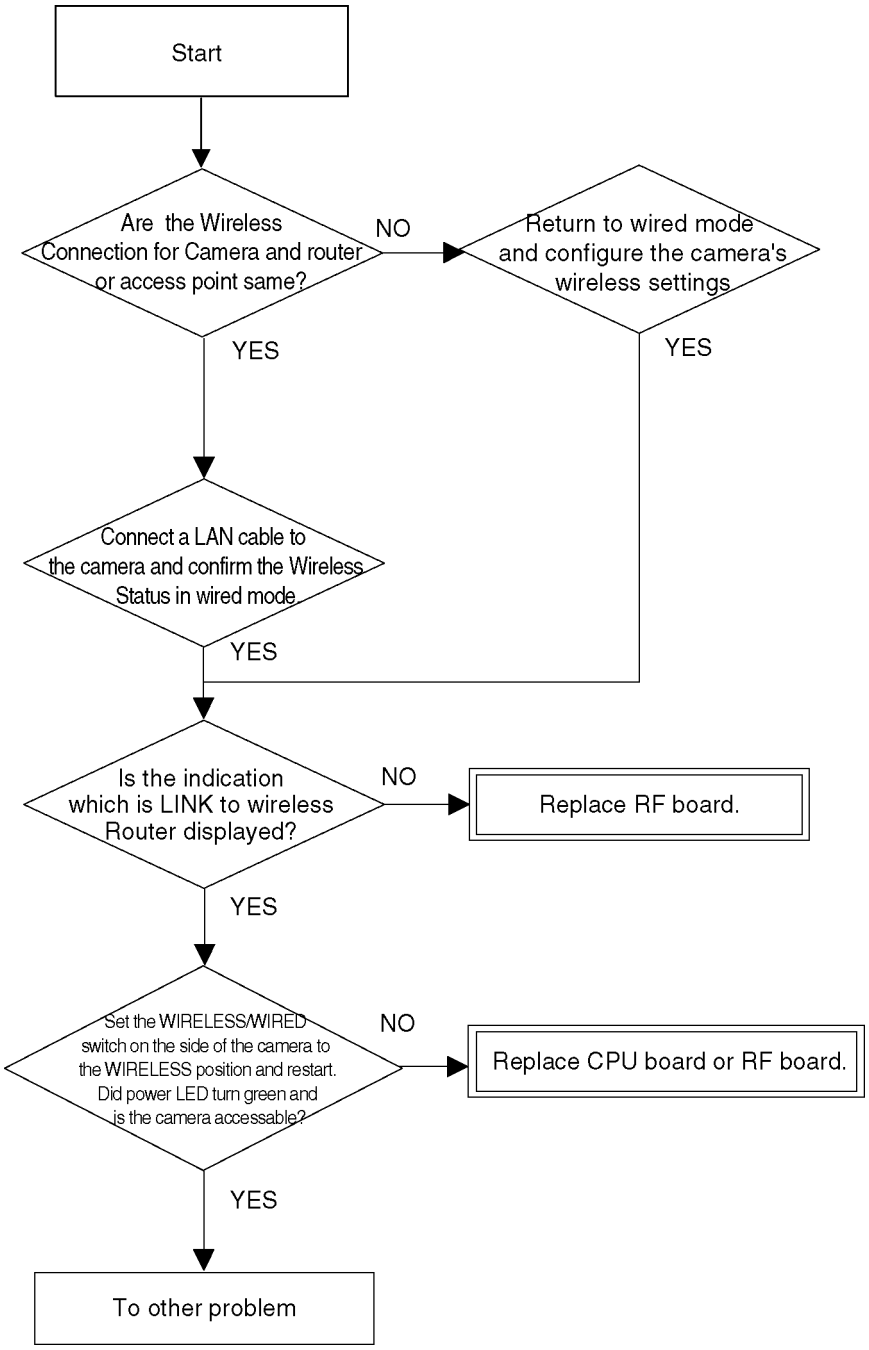
8.7. Pyroelectric Infrared Sensor Check



8.8. Sound Block Check



8.9. RF Block check


Start
Are the Wireless Connection for Camera and router or access point same?
NO
Return to wired mode and configure the camera's wireless settings
YES
YES
Connect a LAN cable to the camera and confirm the Wireless Status in wired mode
YES
Is the indication which is LINK to wireless Router displayed?
NO
Replace RF board.
YES
Set the WIRELESS/WIRED switch on the side of the camera to the WIRELESS position and restart. Did power LED turn green and is the camera accessable?
NO
Replace CPU board or RF board.
YES
To other problem

8.10. Other Problem (External Sensor input / External output)

When External Sensor input / External output does not work as Specifications in Operating Instructions, Confirm the connection of the functions connected and the camera. If there is no problem with the connection, replace CPU board.

8.11. The Inspection After The Repair

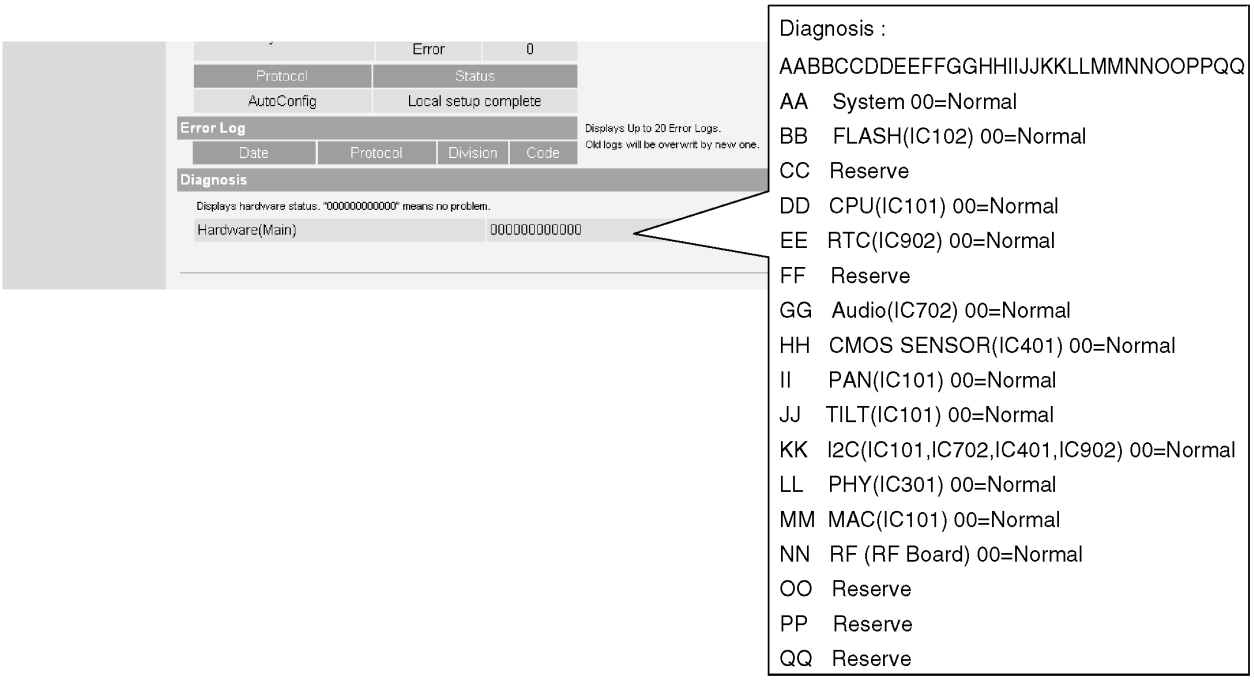
Inspect the following items after the repair.

- Confirm the status (specially MAC Address) refer to Diagnosis NG Check.
- PAN/TILT operation
- Pyroelectric Infrared Sensor
- Video quality

8.12. Diagnosis NG Check

When turning on the power, CPU makes a check using the self-diagnosis function. Check being able to the access to the device described below.

When the self-diagnosis function of the device described below is NG turning on the power, CPU makes a check using the LED indicator red-blinks.



8.13. In Case Where the Main Board Is Replaced and a New MAC Address Label Is Used

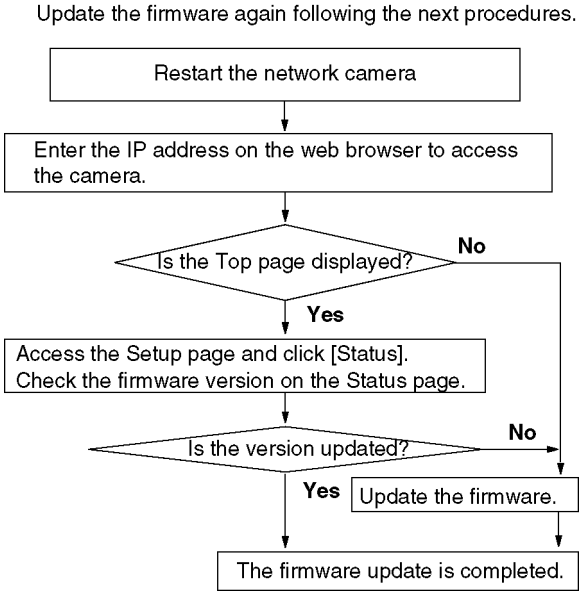
Rewrite the MAC Address of the RF board

1. Turn on the power after replacing the main board (after a new MAC has been written to the main board).
2. Press the Factory Default Reset button after 5 minutes have passed since the power was turned on.
   * Do not turn the power off during execution of work.
3. Renew the MAC Address label.

8.14. Update Firmware

8.14.1. Firmware Trouble Shouting

The firmware updating is not completed due to power off, network failure or other causes.

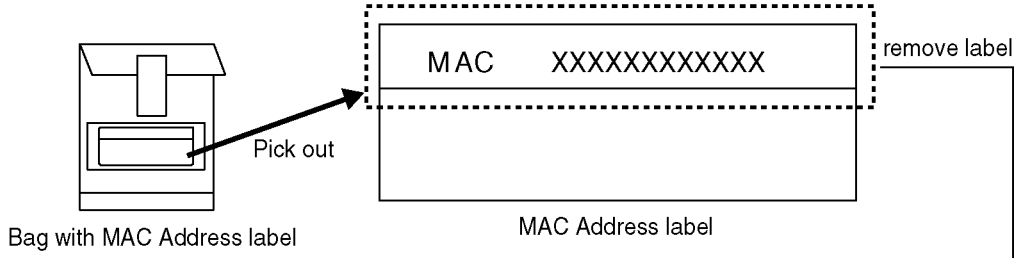

Update the firmware again following the next procedures.
Restart the network camera
Enter the IP address on the web browser to access the camera.
Is the Top page displayed?
No
Yes
Access the Setup page and click [Status].
Check the firmware version on the Status page.
Is the version updated?
No
Yes
Update the firmware.
The firmware update is completed.

8.15. How To Change MAC Address Label

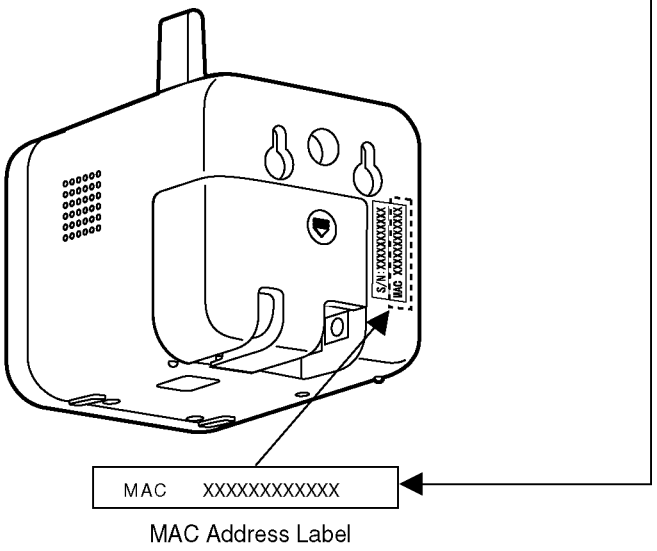
MAC address label caution

When you replace the main board, you must also attach the new MAC address label (included with the main board). Attach the new MAC address label to the unit by placing over the old MAC address label. Make sure the old address cannot be seen.
Throw away the old main board. It cannot be reused.
(If the MAC address of the old main board is already registered via DDNS and thenused in a different camera, the camera cannot be used with DDNS service.)

1. Pick out new MAC address label from bag and remove new Mac address label.



2. Attach the new MAC address label to the unit by placing over the old MAC address label.



8.16. How to Replace a Flat Package IC

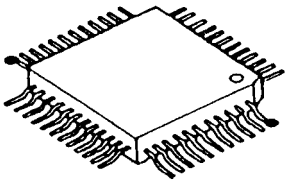
8.16.1. Preparation

- PbF (: Pb free) Solder
- Soldering Iron
  Tip Temperature of 700°F ± 20°F (370°C ± 10°C)
  Note: We recommend a 30 to 40 Watt soldering iron. An expert may be able to use a 60 to 80 Watt iron where someone with less experience could overheat and damage the PCB foil.
- Flux
  Recommended Flux: Specific Gravity → 0.82.
  Type → RMA (lower residue, non-cleaning type)

Note: See **About Lead Free Solder (PbF: Pb free)** (P.3).

8.16.2. Procedure

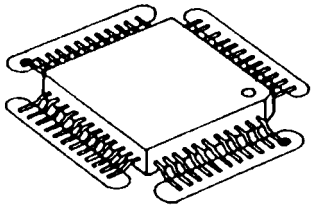
1. Tack the flat pack IC to the PCB by temporarily soldering two diagonally opposite pins in the correct positions on the PCB.



● - - - - - - Temporary soldering point.

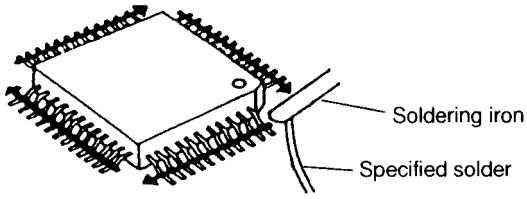
Be certain each pin is located over the correct pad on the PCB.

2. Apply flux to all of the pins on the IC.



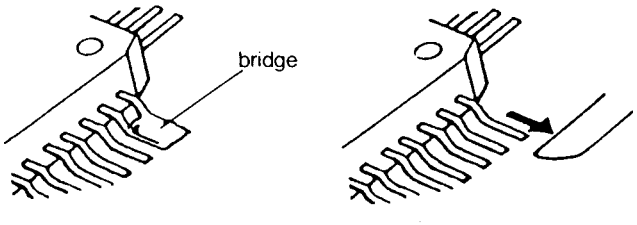
Flux

3. Being careful to not unsolder the tack points, slide the soldering iron along the tips of the pins while feeding enough solder to the tip so that it flows under the pins as they are heated.



8.16.3. Removing Solder from Between Pins

1. Add a small amount of solder to the bridged pins.
2. With a hot iron, use a sweeping motion along the flat part of the pin to draw the solder from between the adjacent pads.



9 Disassembly and Assembly Instructions

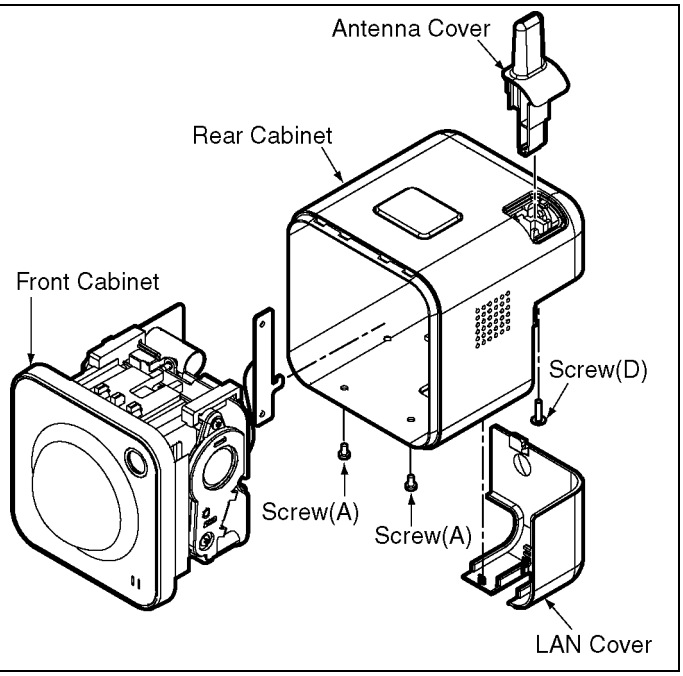
MAC address label caution

When you replace the main board, you must also attach the new MAC address label (included with the main board). Attach the new MAC address label to the unit by placing over the old MAC address label. Make sure the old address cannot be seen.
Throw away the old main board. It cannot be reused.
(If the MAC address of the old main board is already registered via DDNS and thenused in a different camera, the camera cannot be used with DDNS service.)
Refer to How to change MAC Address Label (p.38)

9.1. Disassembly Instructions

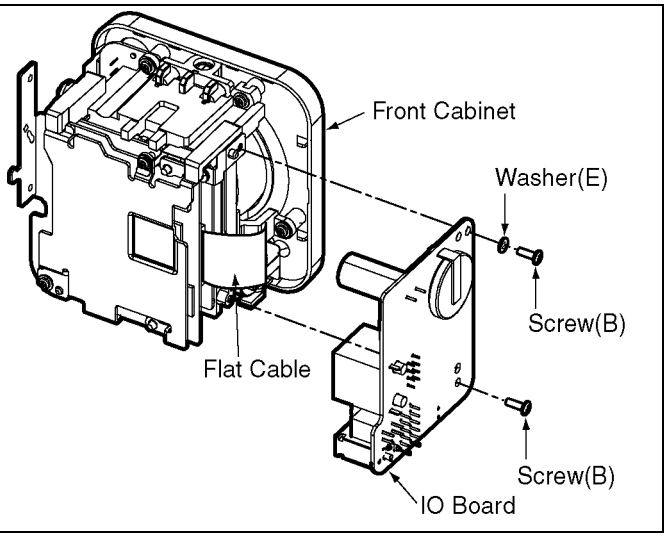
9.1.1. How To Remove Front Cabinet [No.1] (Procedure No.1)

1. Remove the LAN Cover.
2. Remove a Screw (D) and the Antenna Cover.
3. Remove two Screws (A).
4. Remove the Front Cabinet from the Rear Cabinet.



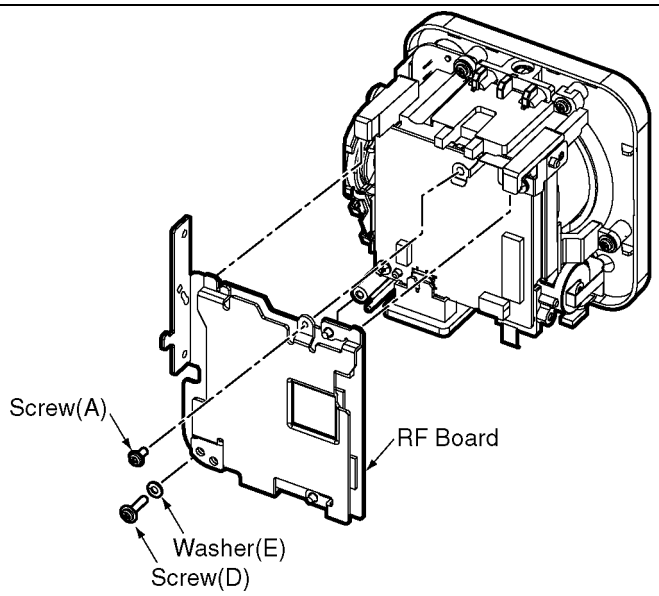
9.1.2. How To Remove I/O Board [No.2] (Procedure No.1→2)

1. Remove two Screws (B) and a Washer (E).
2. Remove a Flat Cable and the IO Board.



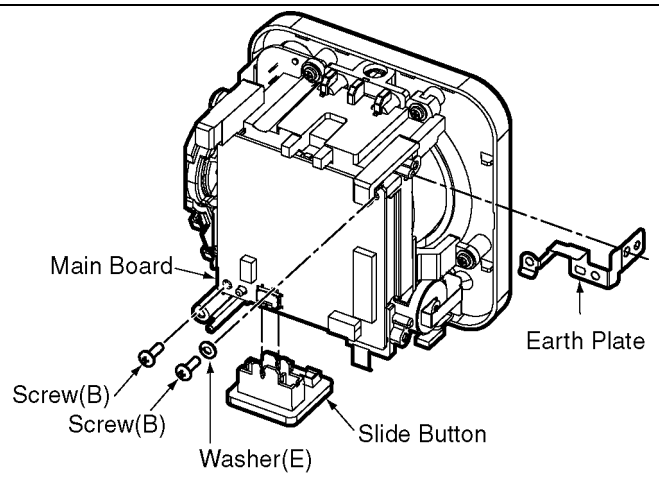
9.1.3. How To Remove RF Board [No.3] (Procedure No.1→2→3)

1. Remove two Screws (A, D) and a Washer (E).
2. Remove the RF Board.

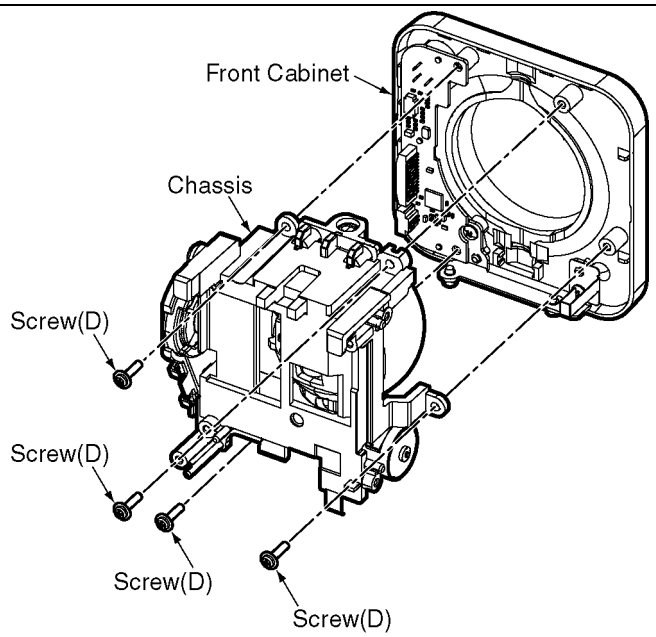


9.1.4. How To Remove Main Board [No.4] (Procedure No.1→2→3→4)

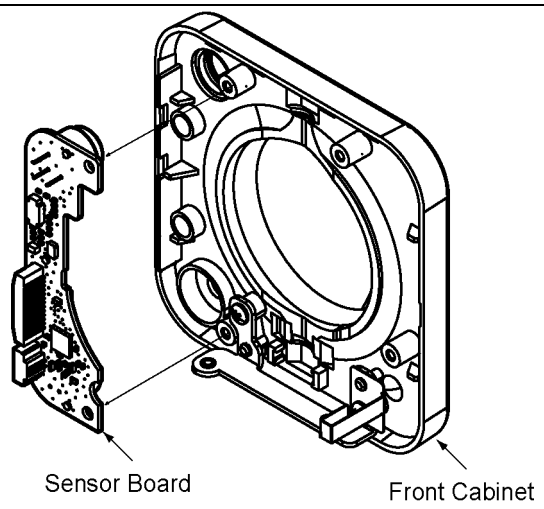
1. Remove two Screws (B) and a Washer (E).
2. Remove an Earth Plate.
3. Remove the Slide Button from the Main Board.
4. Remove four Flat Cables and the Main Board.



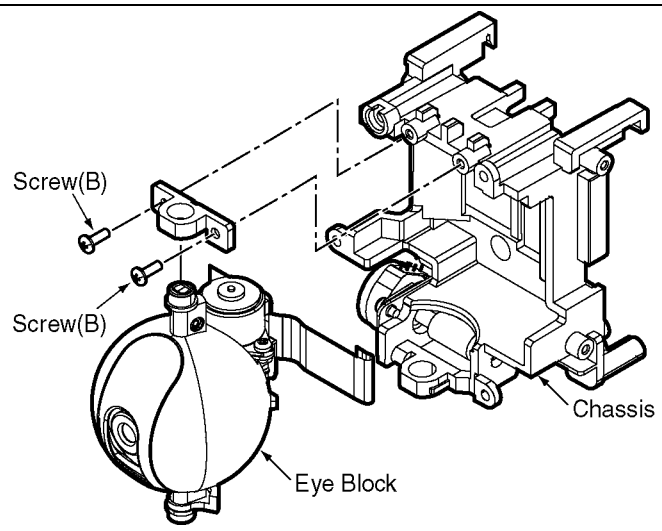
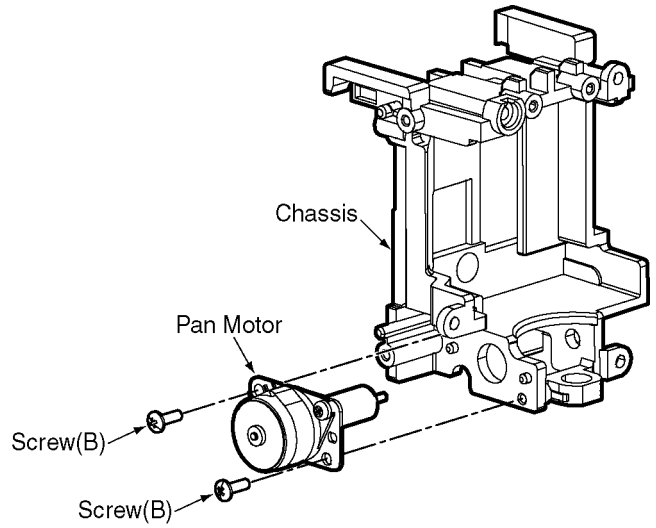
9.1.5. How To Remove Chassis [No.5] (Procedure No.1→2→3→4→5)

1. Remove four Screws (D). 2. Remove the Chassis from the Front Cabinet.	

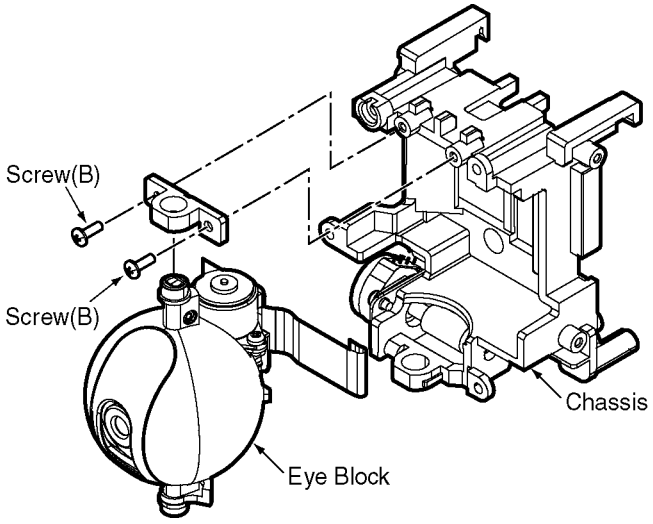
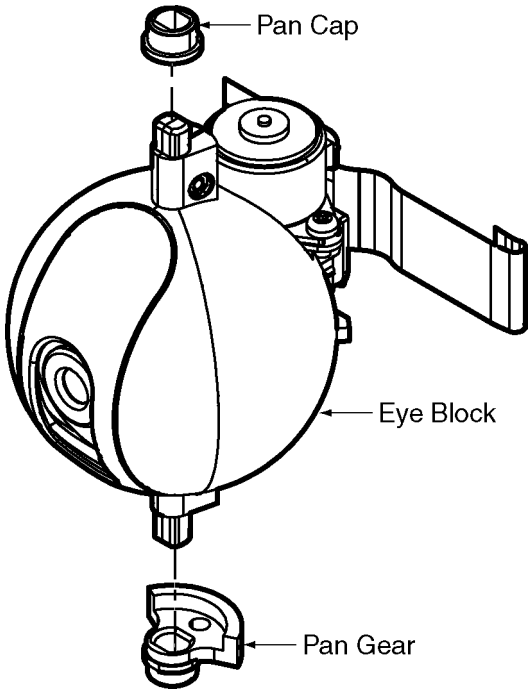
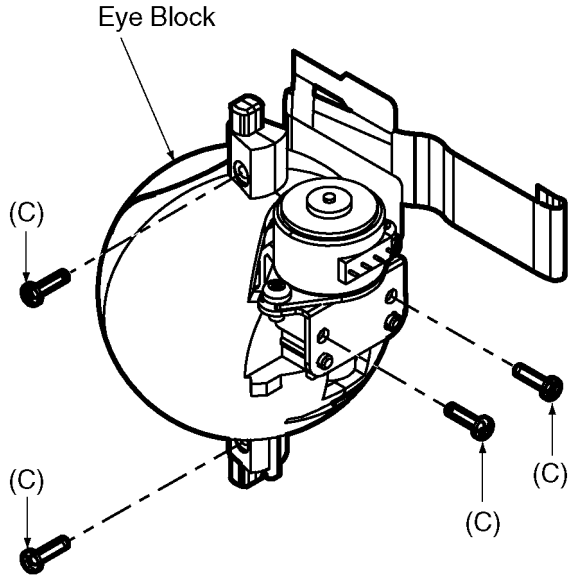
9.1.6. How To Remove Sensor Board [No.6] (Procedure No.1→2→3→4→5→6)

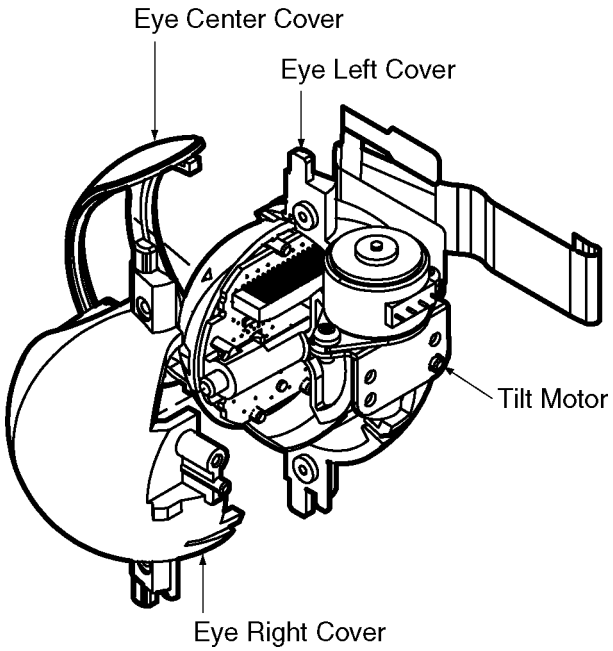
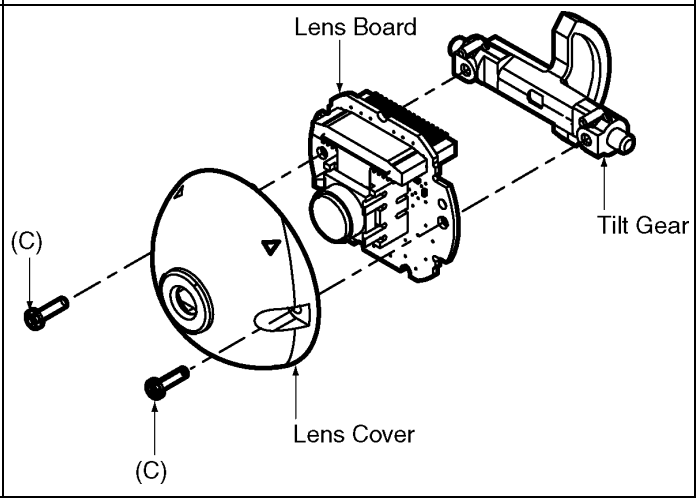
1. Remove the Sensor Board from the Front Cabinet.	

9.1.7. How To Remove Pan Motor [No.7] (Procedure No.1→2→3→4→5→7)

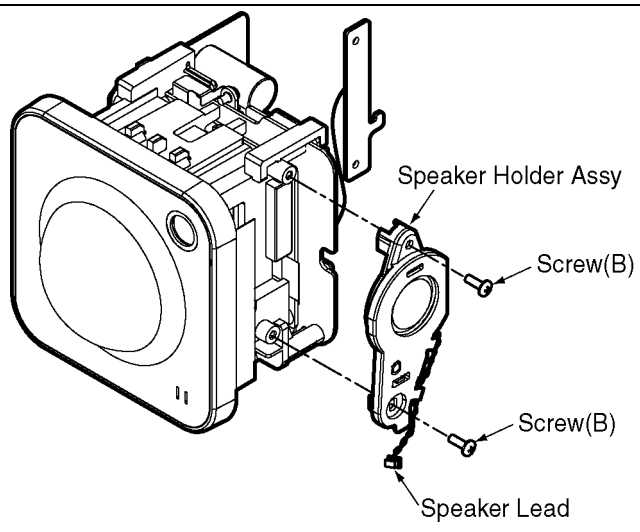
1. Remove two Screws (B). 2. Remove the Eye Block from the Chassis.	
3. Remove two Screws (B). 4. Remove the Pan Motor from the Chassis.	

9.1.8. How To Remove Tilt Motor and Lens Board Unit [No.8] (Procedure No.1→2→3→4→5→8)

1. Remove two Screws (B). 2. Remove the Eye Block from the Chassis	
3. Remove the Pan Cap and the Pan Gear from the Eye Block.	
4. Remove four Screws (C).	

5. Remove the Eye Right Cover, Eye Center Cover and the Eye Left Cover. 6. Remove a Flat Cable and remove the Tilt Motor.	
7. Remove two Screws (C) and remove the Lens Board.	

9.1.9. How To Remove Speaker Holder Ass'y [No.9] (Procedure No.1→9)

1. Remove two Screws (B). 2. Remove the Speaker Lead and the Speaker Holder Ass'y.	

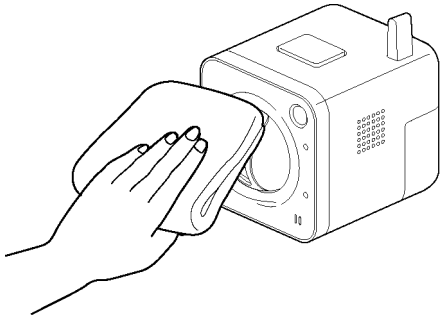
10 Maintenance

10.1. Cleaning the Camera

For best performance, we recommend cleaning the camera periodically. Turn the camera off before cleaning it.

10.1.1. Cleaning the main unit

Clean the unit with a dry and soft cloth.



Note:

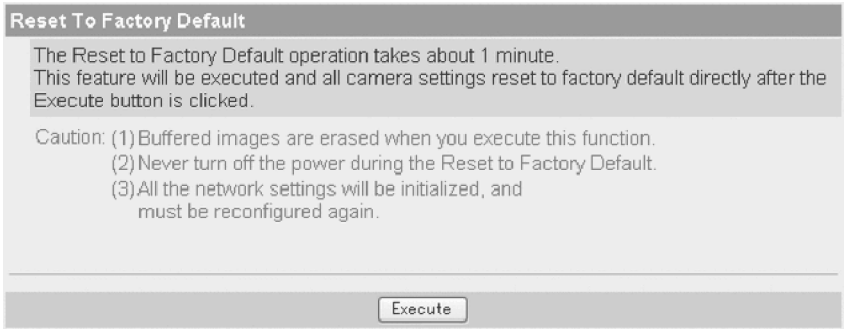
- Do not use alcohol, polishing powder, cleanser, benzine, thinner, wax, petroleum products, pesticides, glass cleaners, hair spray, or hot water when cleaning the camera, as they may cause a change in the shape or color of the camera.
- Do not directly touch the lens cover. Fingerprints may cause the image to be out of focus.
- If the built-in sensor has dust on it, it may not make detections properly. Keep the built-in sensor clean.

11 Factory Setting

11.1. Resetting the Camera

You can reset all of the camera's settings to their factory default settings.

1. Click the [Maintenance] tab.
2. On the left side of the screen under [Maintenance], click [Reset to Factory Default].


Reset To Factory Default
The Reset to Factory Default operation takes about 1 minute.
This feature will be executed and all camera settings reset to factory default directly after the Execute button is clicked.
Caution: (1) Buffered images are erased when you execute this function.
(2) Never turn off the power during the Reset to Factory Default.
(3) All the network settings will be initialized, and must be reconfigured again.
Execute

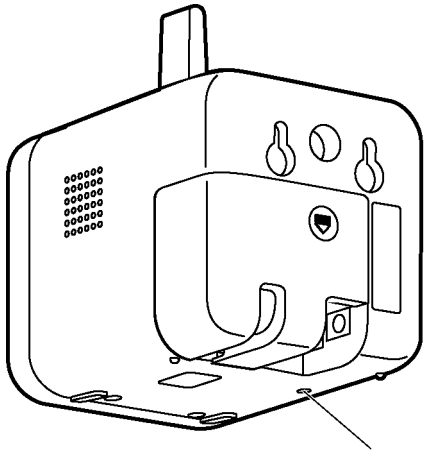
3. Click [Execute].
   - The POWER indicator flashes orange, and then turns off for a few seconds.

Note:

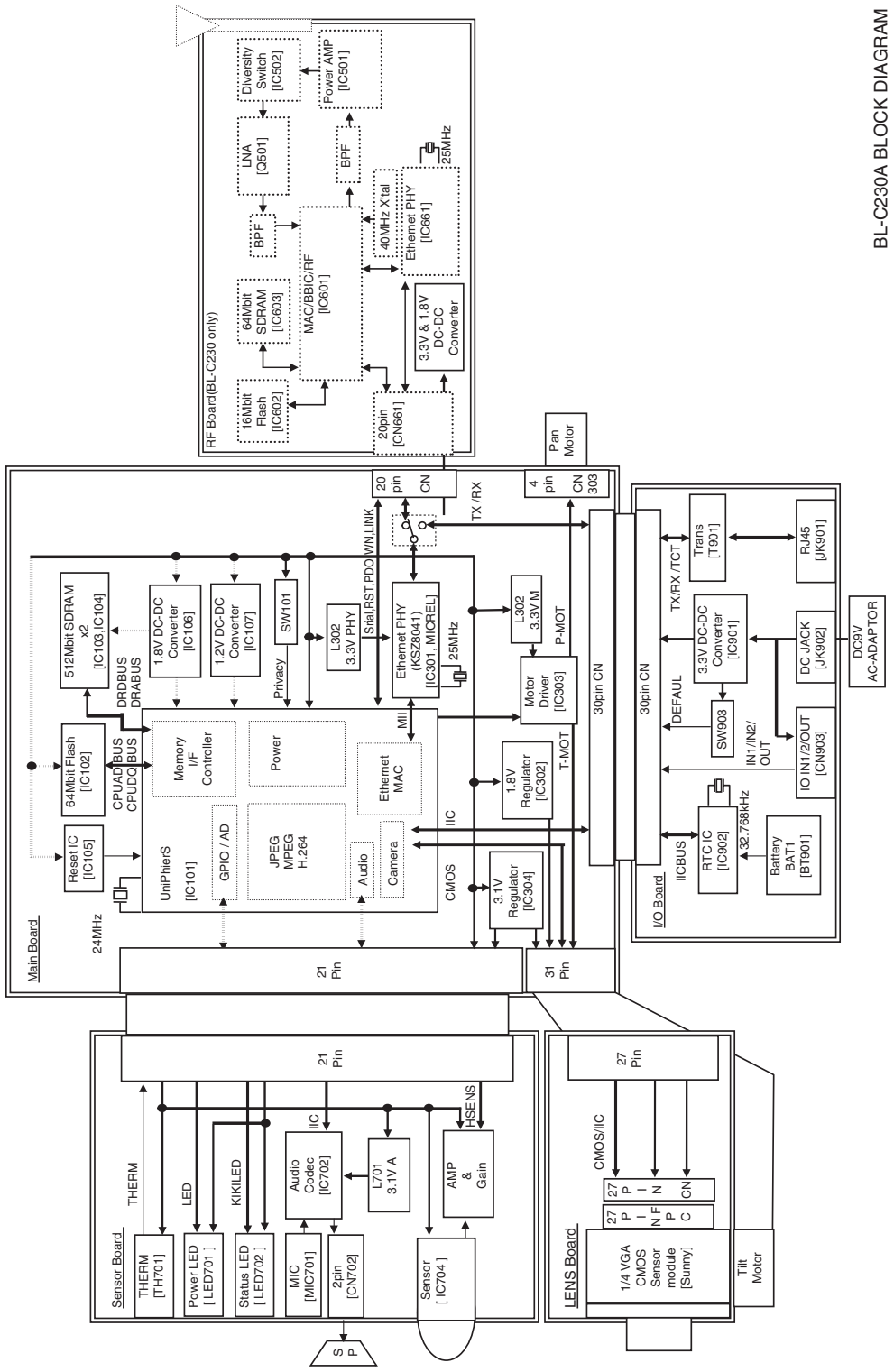
- Do not turn off the camera while the camera is being reset. When the lens finishes panning and tilting, it is safe to turn off the camera.
- When the camera is reset, the following information will be deleted:
  - All images buffered in the internal memory
  - All alarm logs
  - All camera settings (including the user name, password, IP address, subnet mask etc.)
    The network connection mode changes to [Automatic Setup]. Reconfigure the camera by referring to the Setup Guide.
- When the camera is reset, the internal clock will not be reset, but the time format will be set to AM/PM mode. Change the setting if necessary.

11.2. Resetting the Camera Using the FACTORY DEFAULT RESET Button

You can also reset all of the camera's settings to their factory default settings by pressing the FACTORY DEFAULT RESET button for about one second with a pointed object.



12 Block Diagram

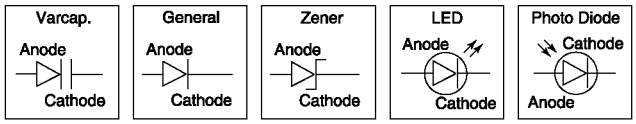


13 Schematic Diagram

13.1. For The Schematic Diagram

Note:

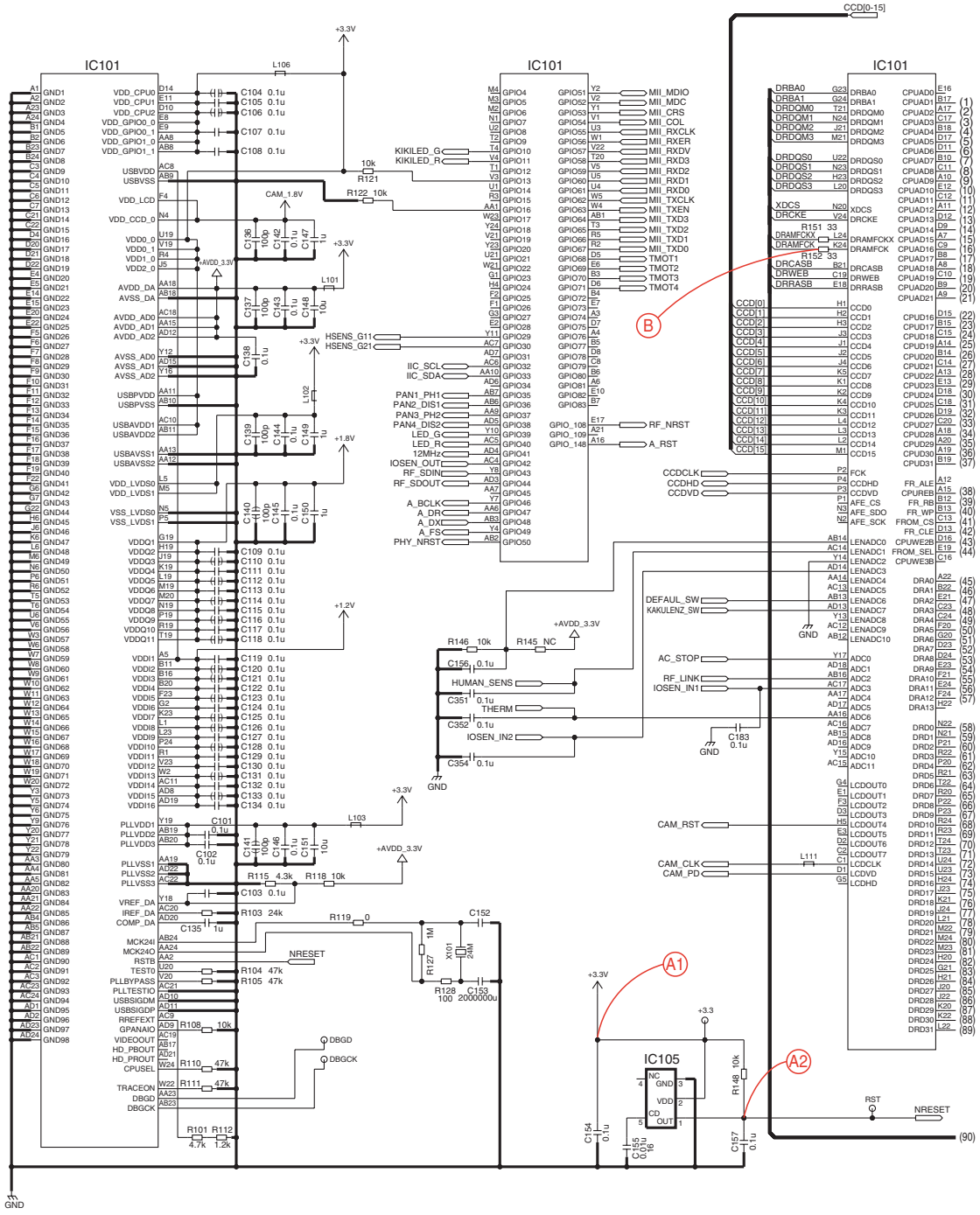
1. DC voltage measurements are taken with an oscilloscope or a tester with a ground.
2. The schematic diagrams and circuit board may be modified at any time with the development of new technology.



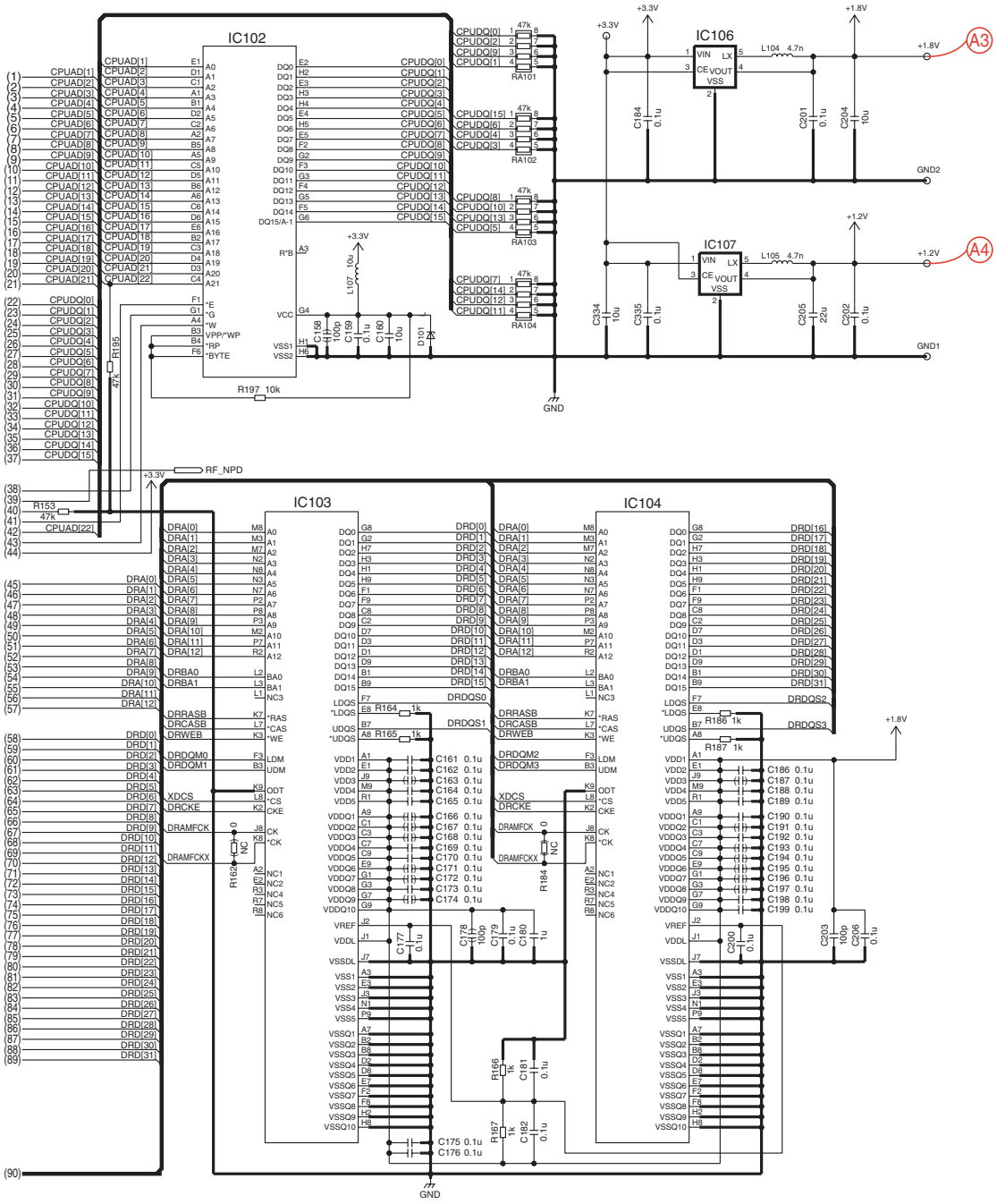
Important safety notice
Components identified by ⚠ mark have special characteristics important for safety. When replacing any of there components, use only manufacturer's specified parts.

13.2. Schematic Diagram

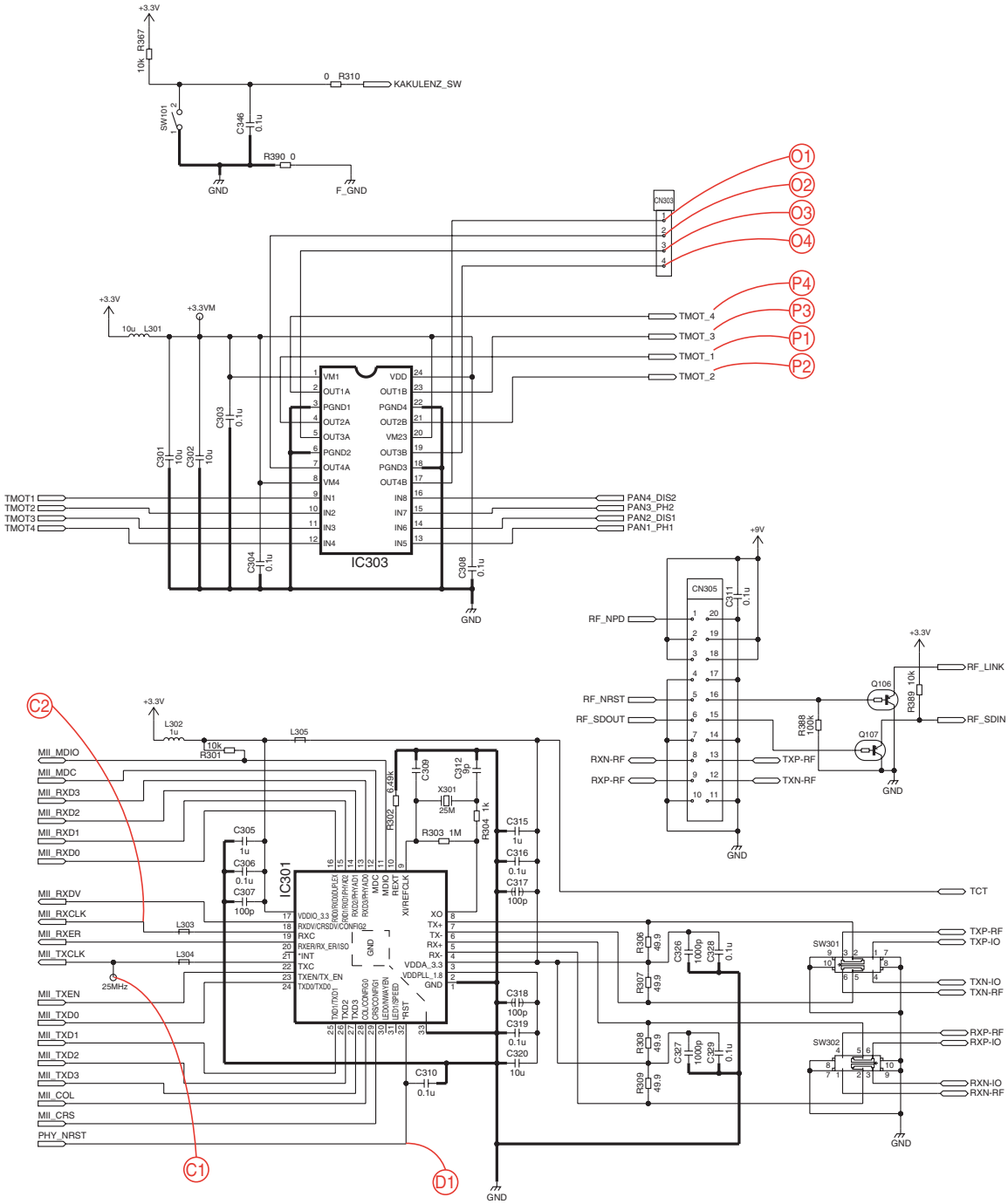
13.2.1. Main Board



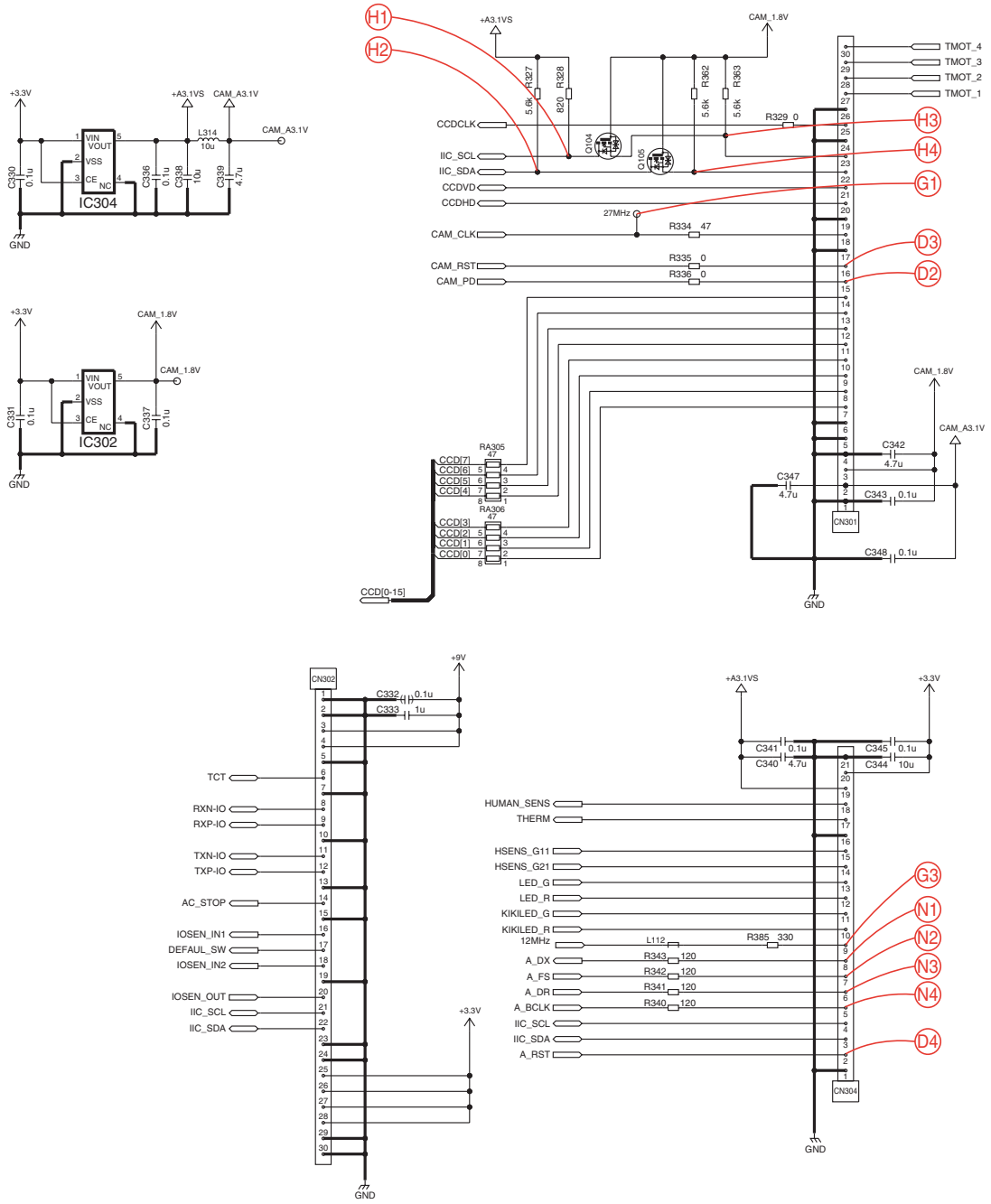
BL-C230A MAIN BOARD No.1 (1/2)



BL-C230A MAIN BOARD No.1 (2/2)

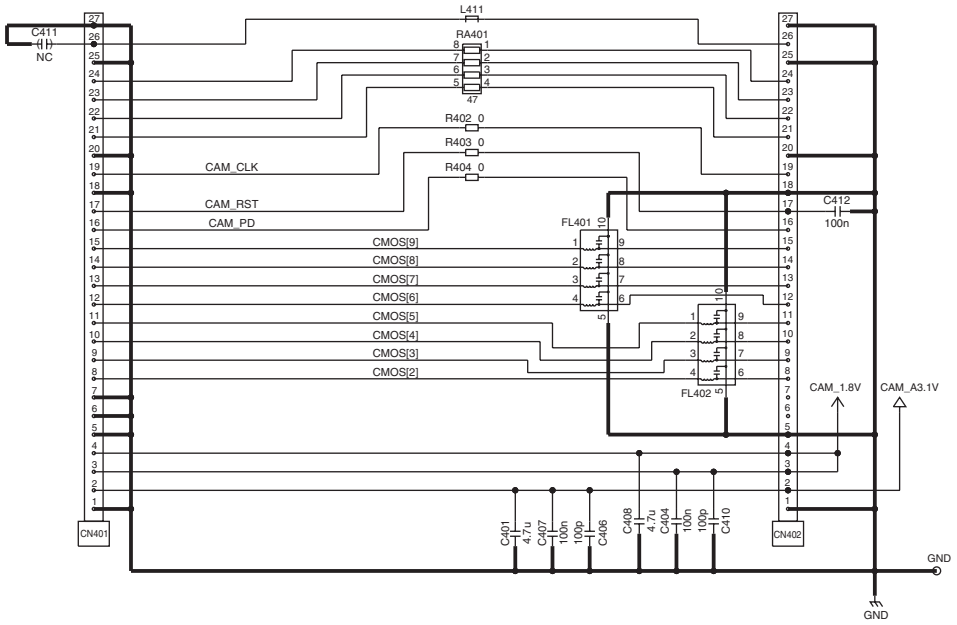


BL-C230A MAIN BOARD No.2 (1/2)



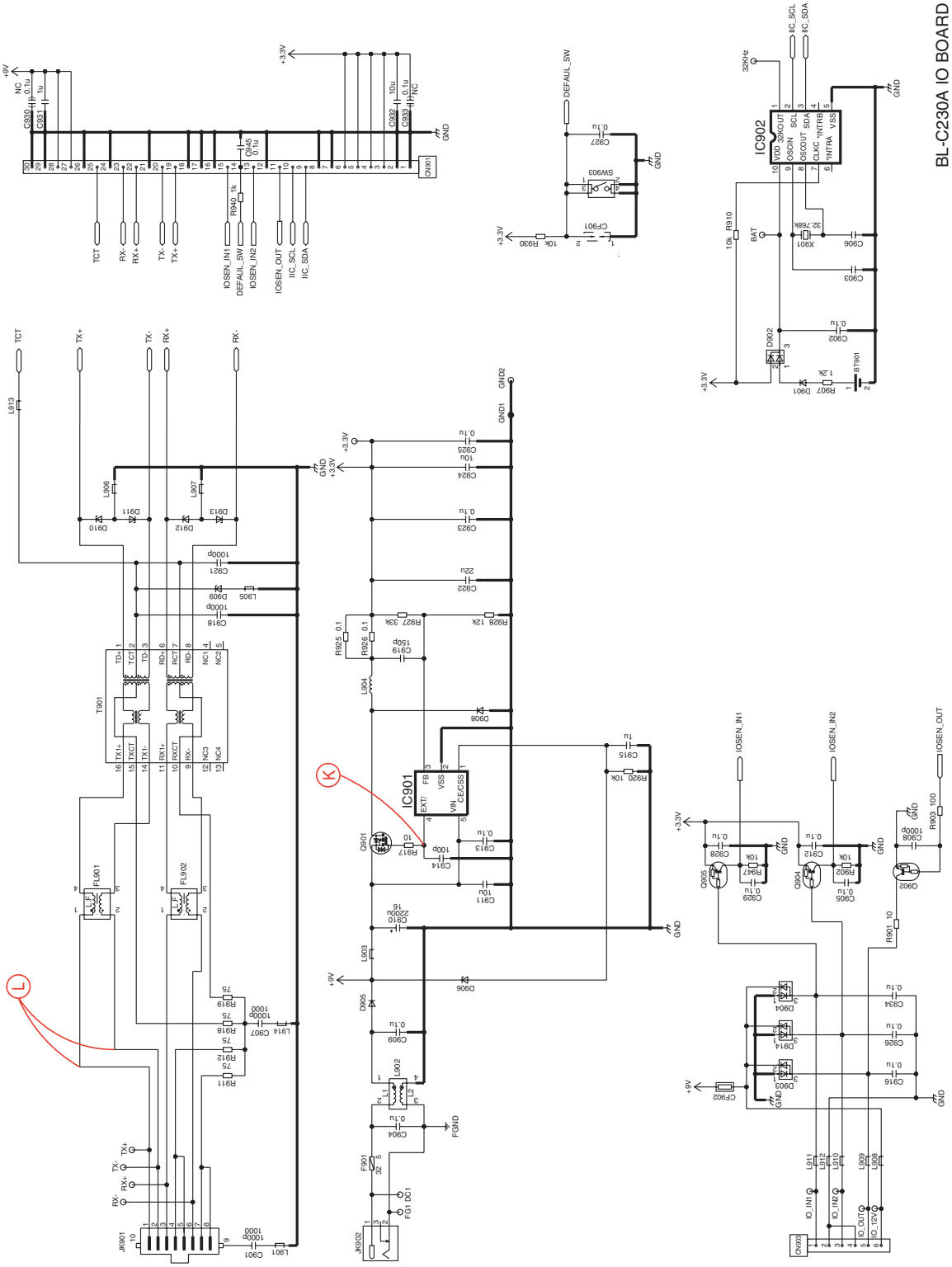
BL-C230A MAIN BOARD No.2 (2/2)

13.2.2. Lens Board

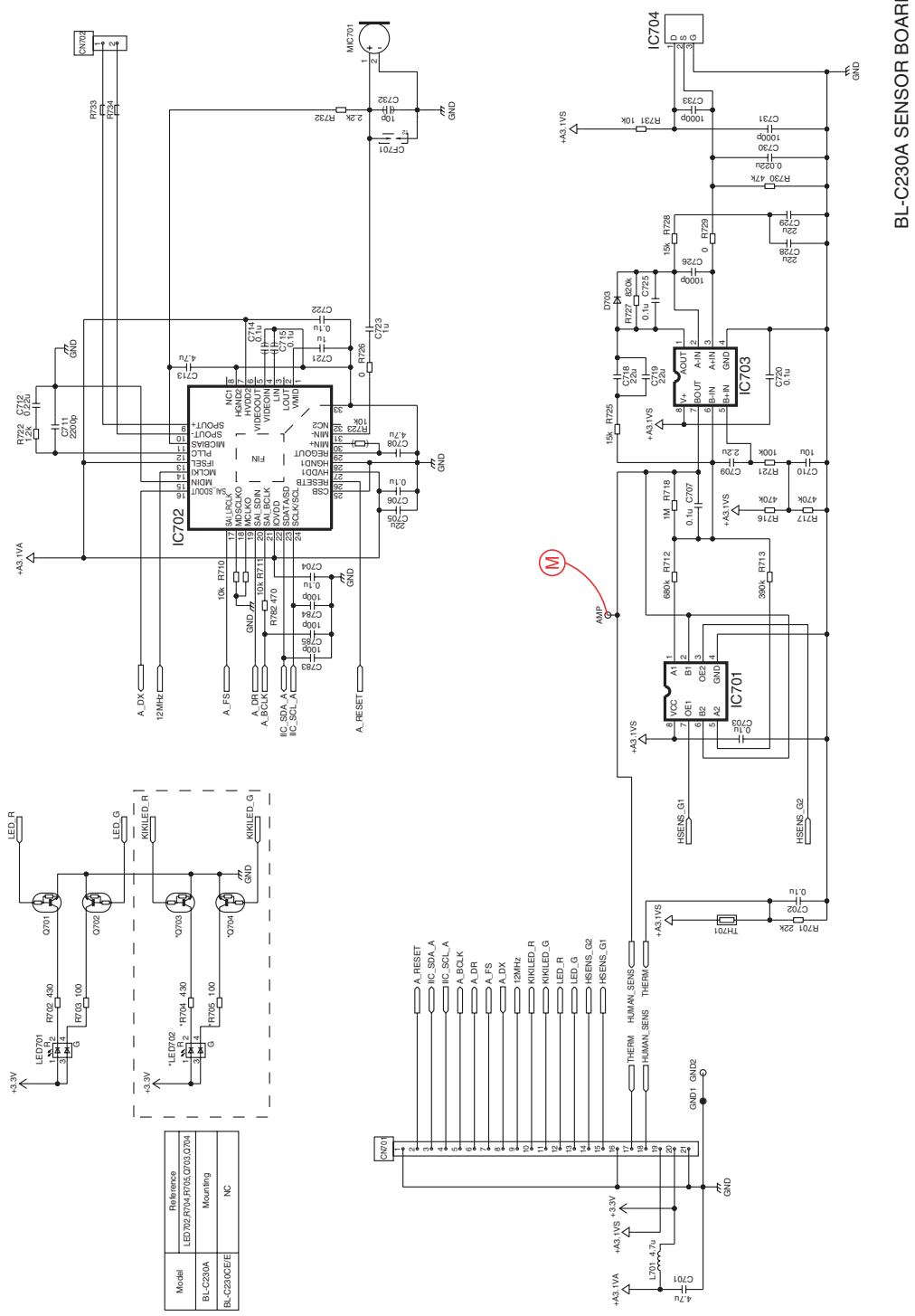


BL-C230A LENS BOARD

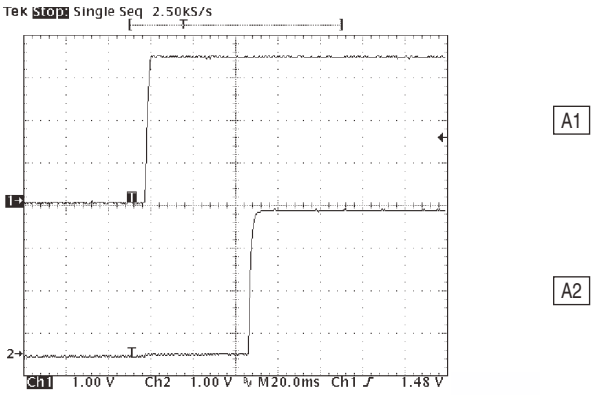
13.2.3. I/O Board



13.2.4. Sensor Board



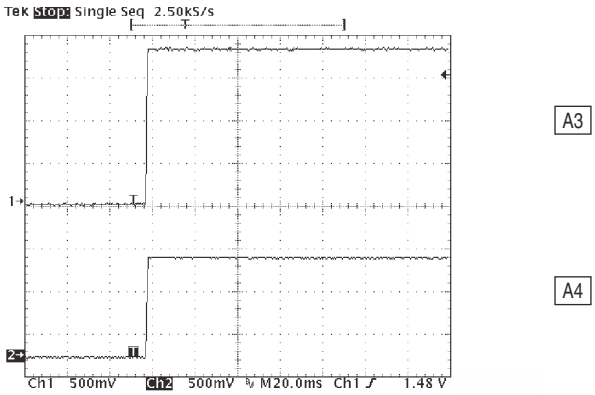
13.3. Waveform



A1

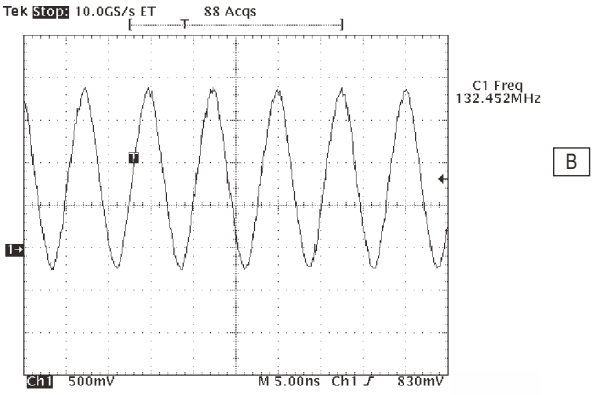
A2

(Power ON Start)

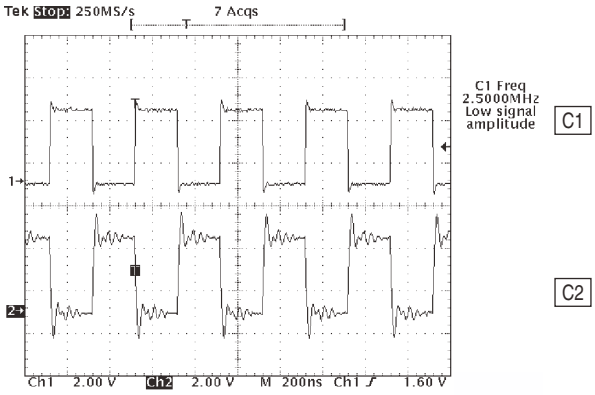


A3

A4



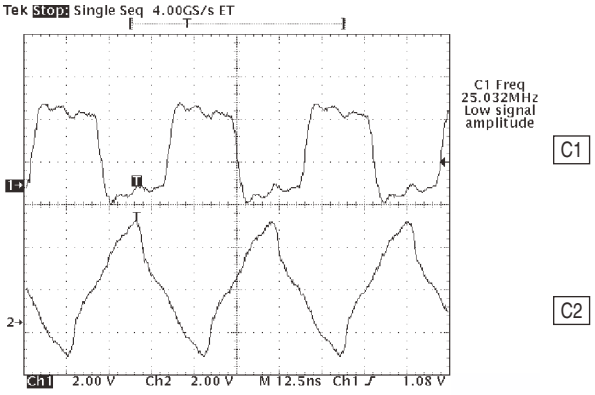
B



C1

C2

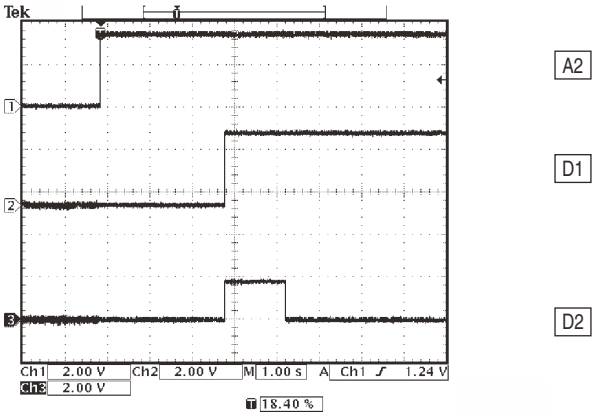
(10BASE-T Communication)



C1

C2

(100BASE-TX Communication)

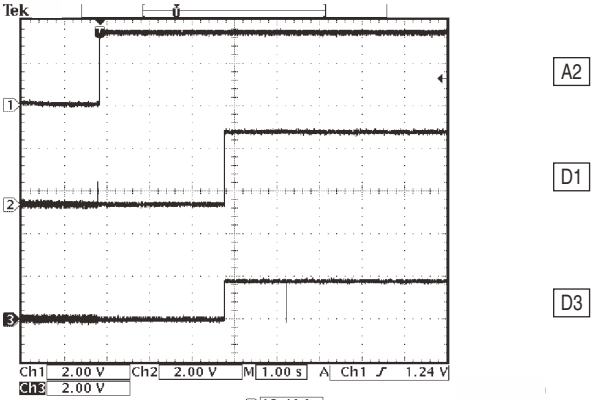


A2

D1

D2

(Power ON Start)

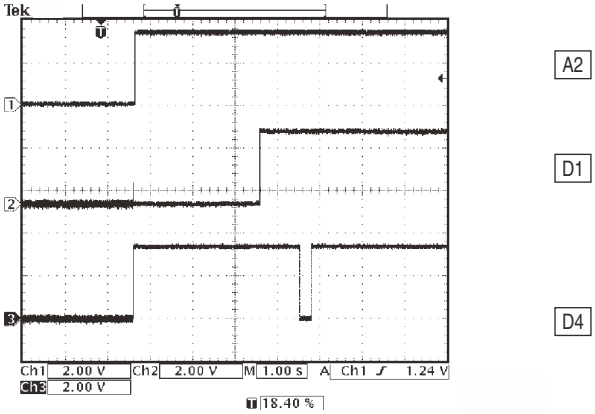


A2

D1

D3

(Power ON Start)

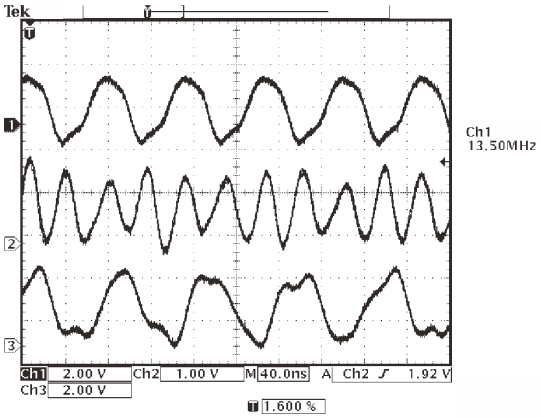


A2

D1

D4

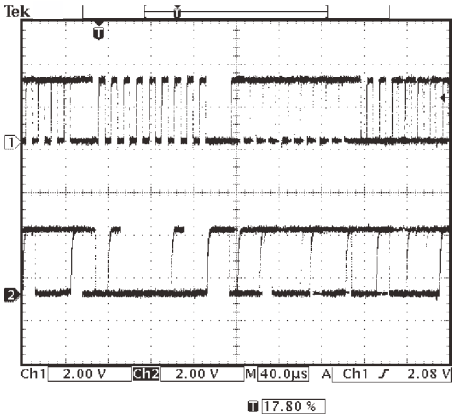
(Power ON Start)



G1

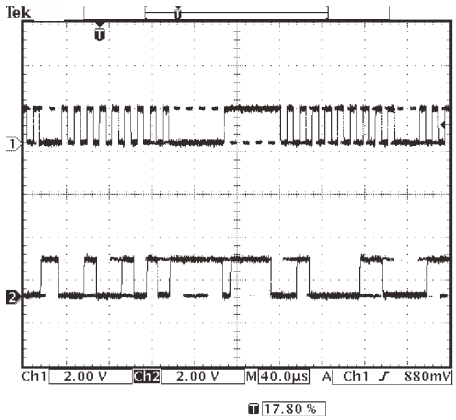
G2

G3



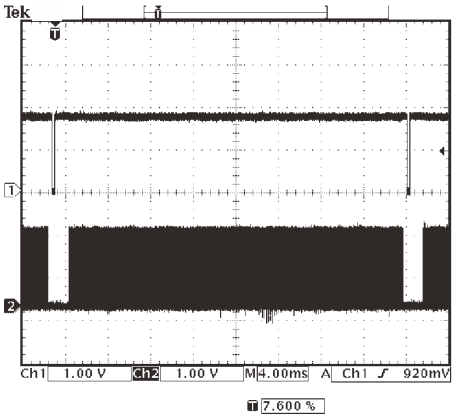
H1

H2



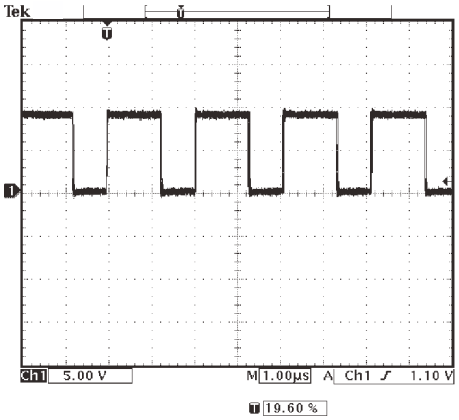
H3

H4

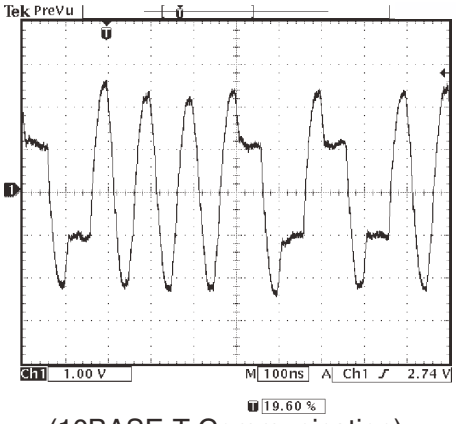


J1

J2

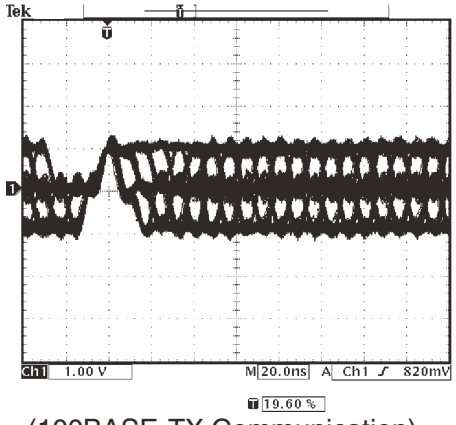


K



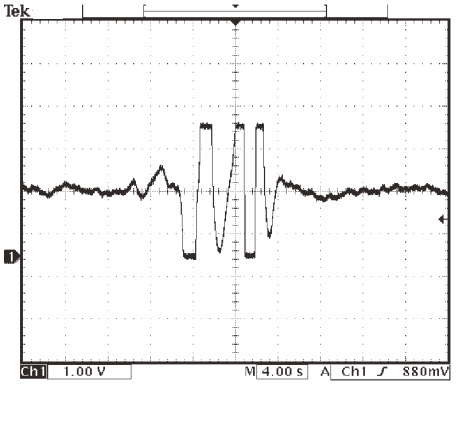
L

(10BASE-T Communication)

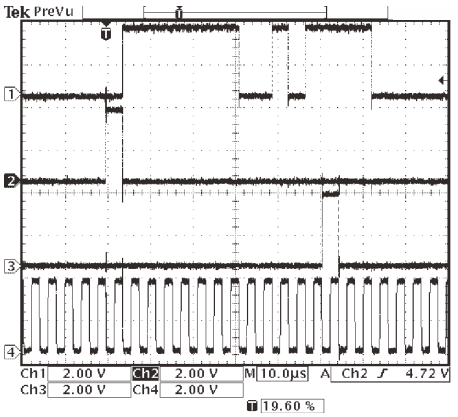


L

(100BASE-TX Communication)



M

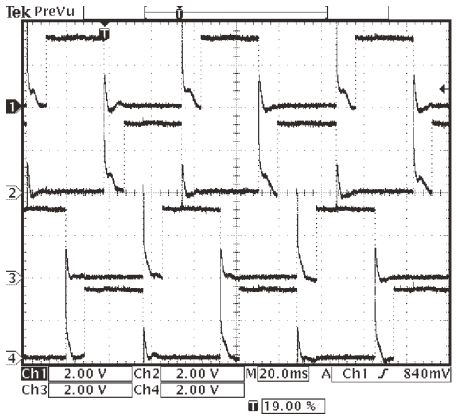


N1

N2

N3

N4



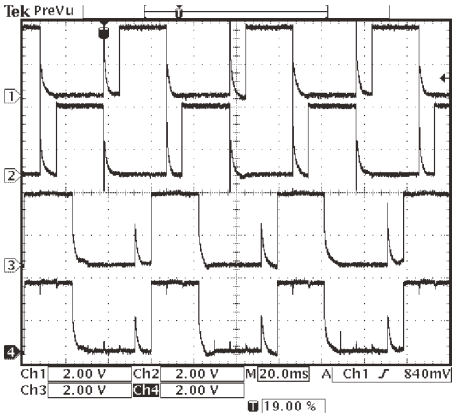
O1

O2

O3

O4

(PAN SCAN)



P1

P2

P3

P4

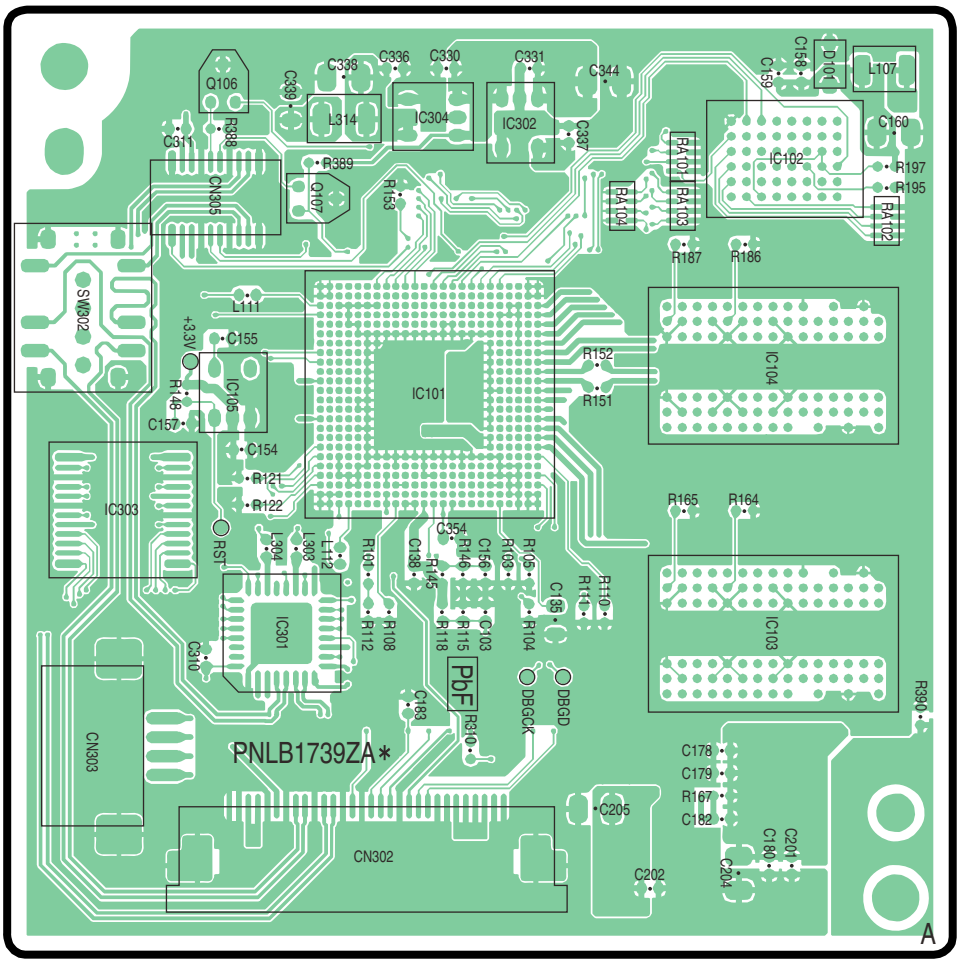
(TILT SCAN)

BL-C230A

Memo:

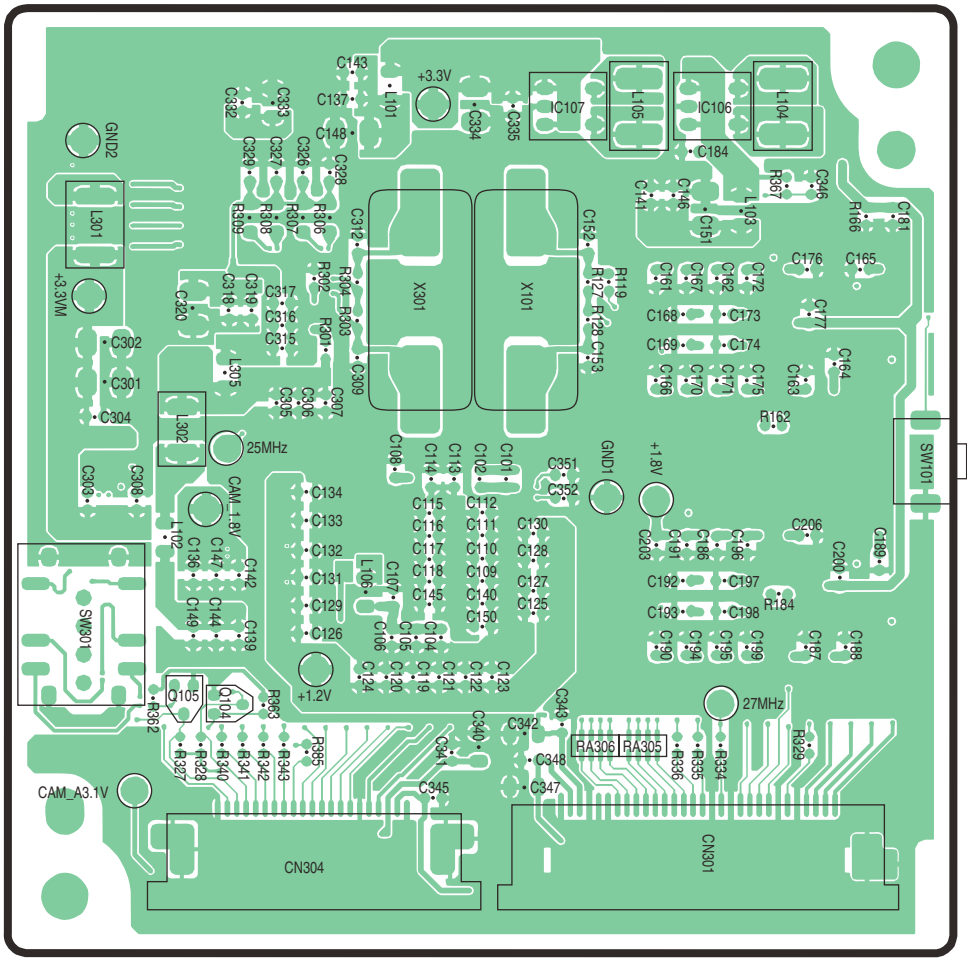
14 Printed Circuit Board

14.1. Main Board (Component View)



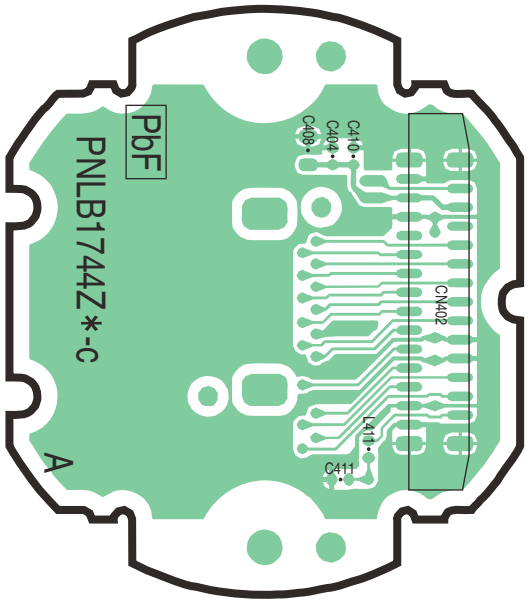
BL-C230A MAIN BOARD

14.2. Main Board (Bottom View)



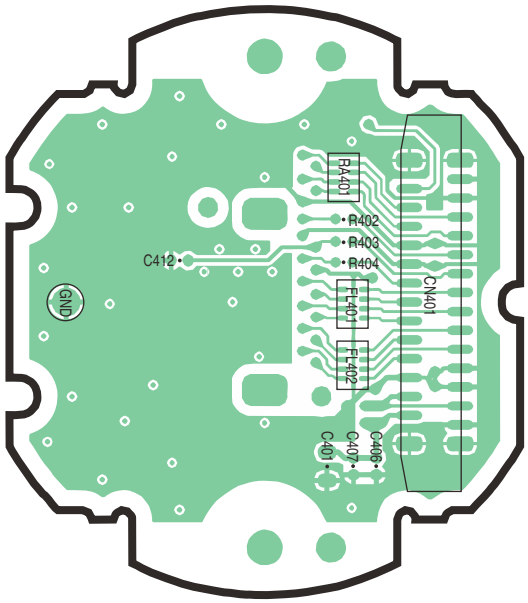
BL-C230A MAIN BOARD

14.3. Lens Board (Component View)



BL-C230A LENS BOARD

14.4. Lens Board (Bottom View)

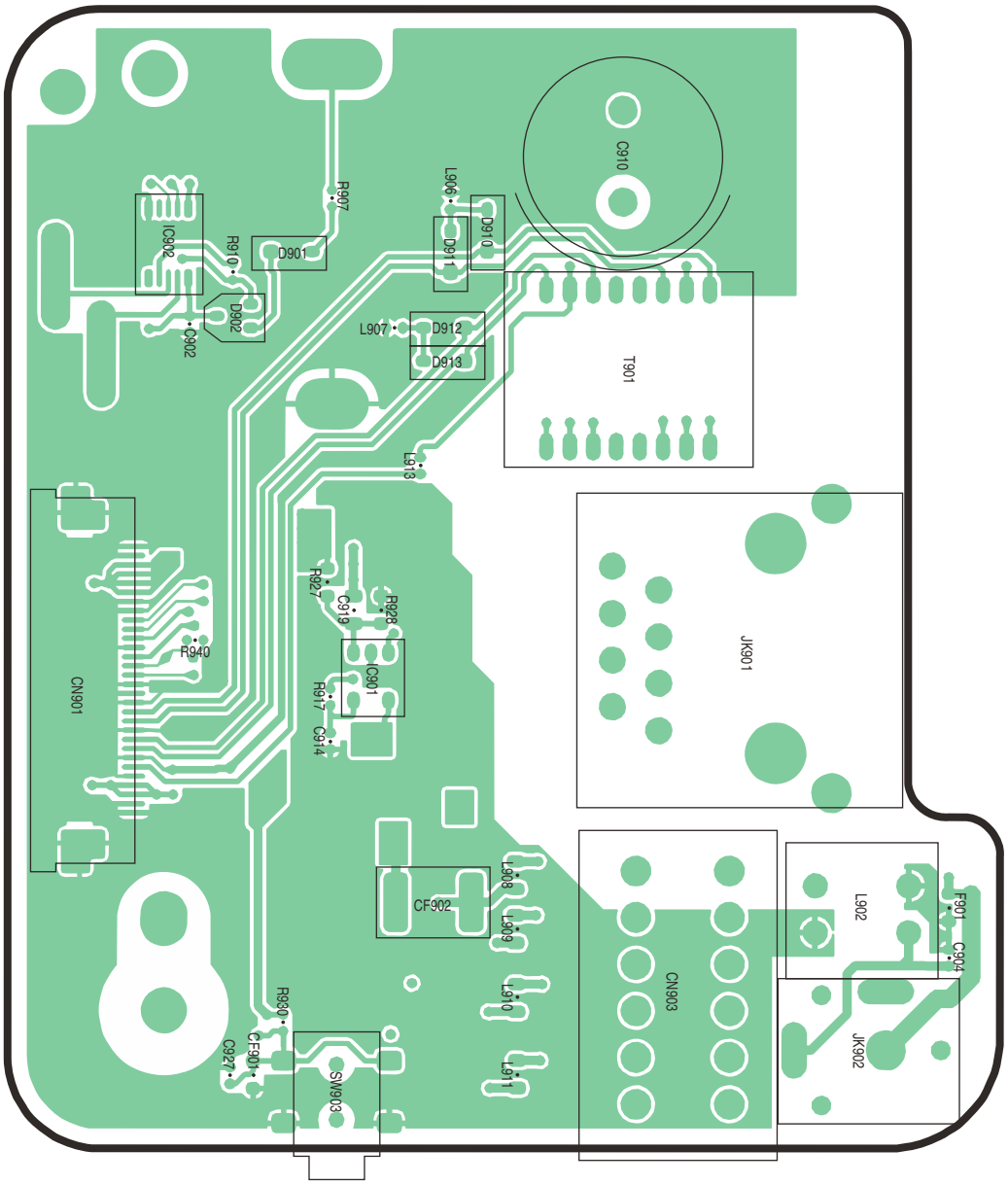


BL-C230A LENS BOARD

BL-C230A

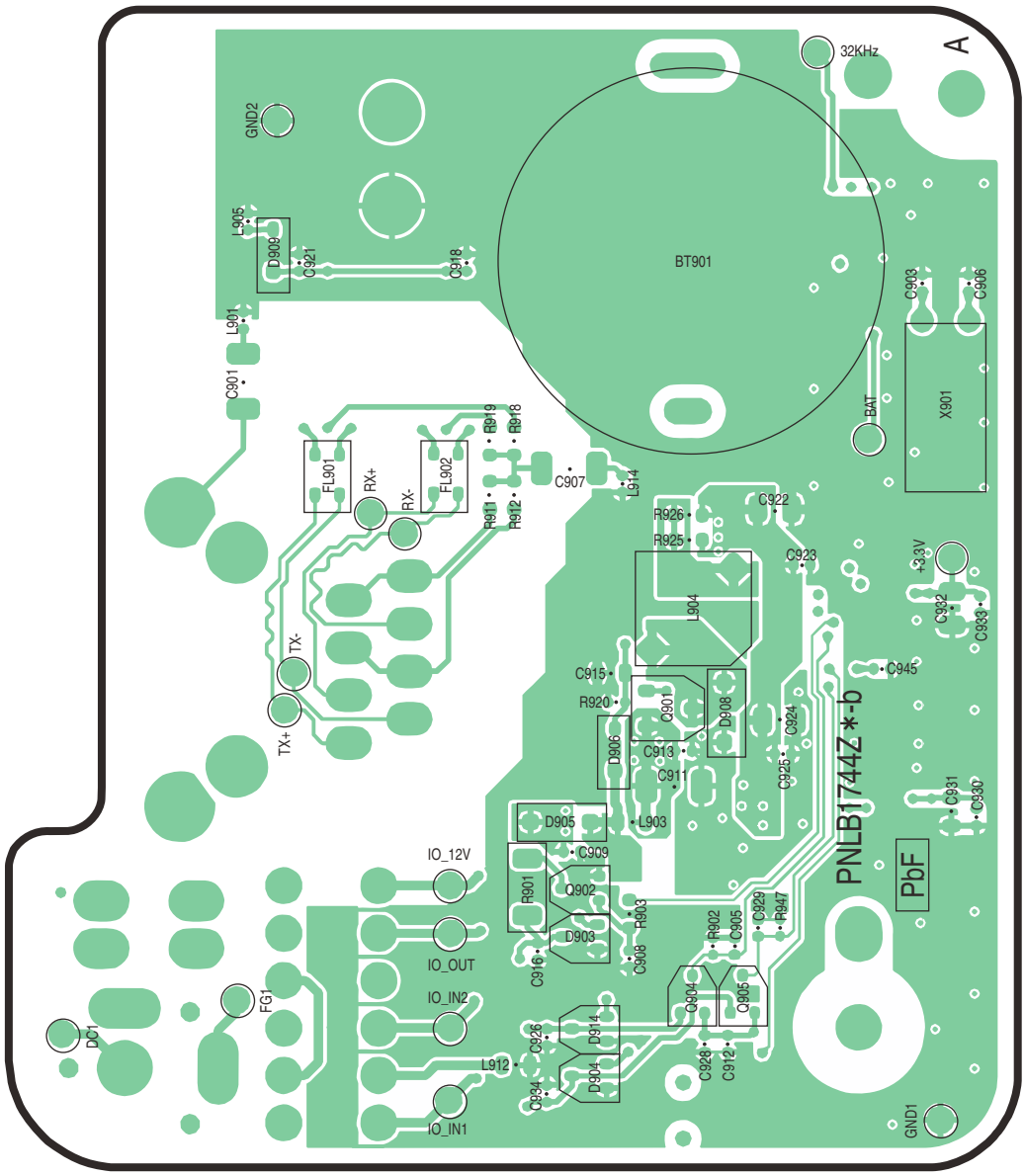
Memo:

14.5. I/O Board (Component View)



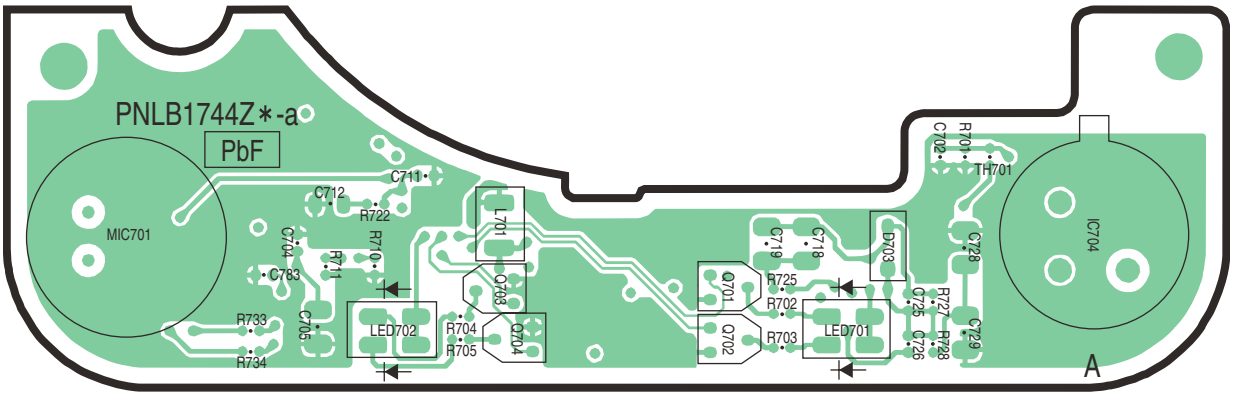
BL-C230A IO BOARD

14.6. I/O Board (Bottom View)



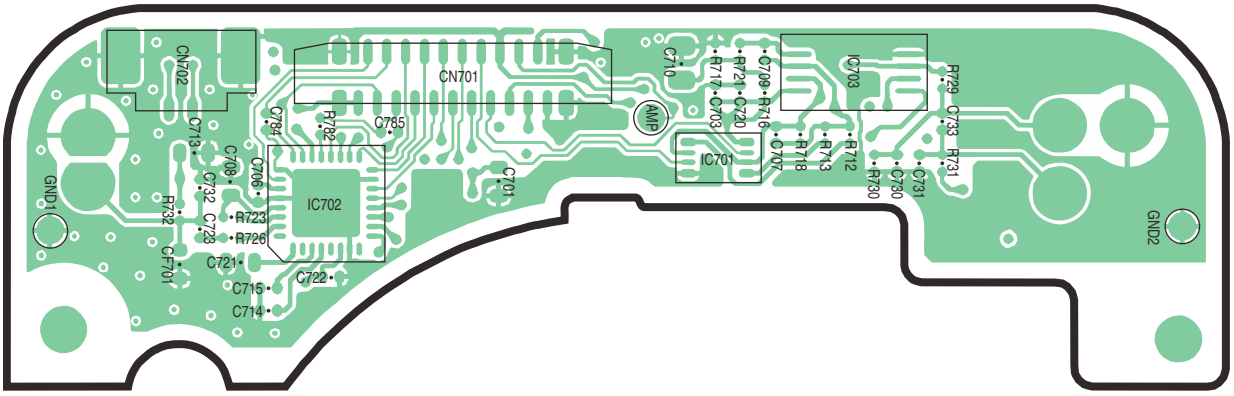
BL-C230A IO BOARD

14.7. Sensor Board (Component View)



BL-C230A SENSOR BOARD

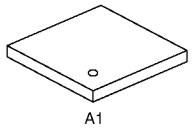
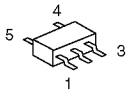
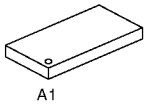
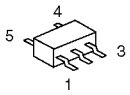
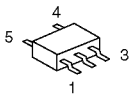
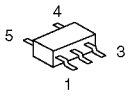
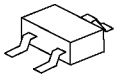
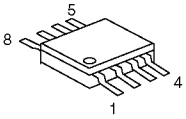
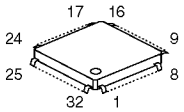
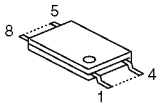
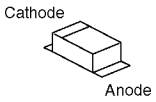
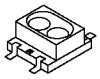
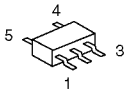
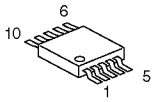
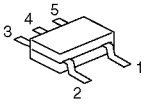
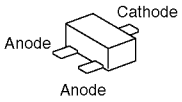
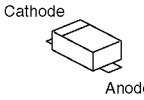
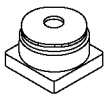
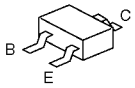
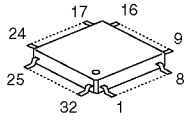
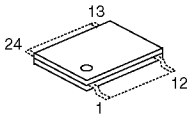
14.8. Sensor Board (Bottom View)



BL-C230A SENSOR BOARD

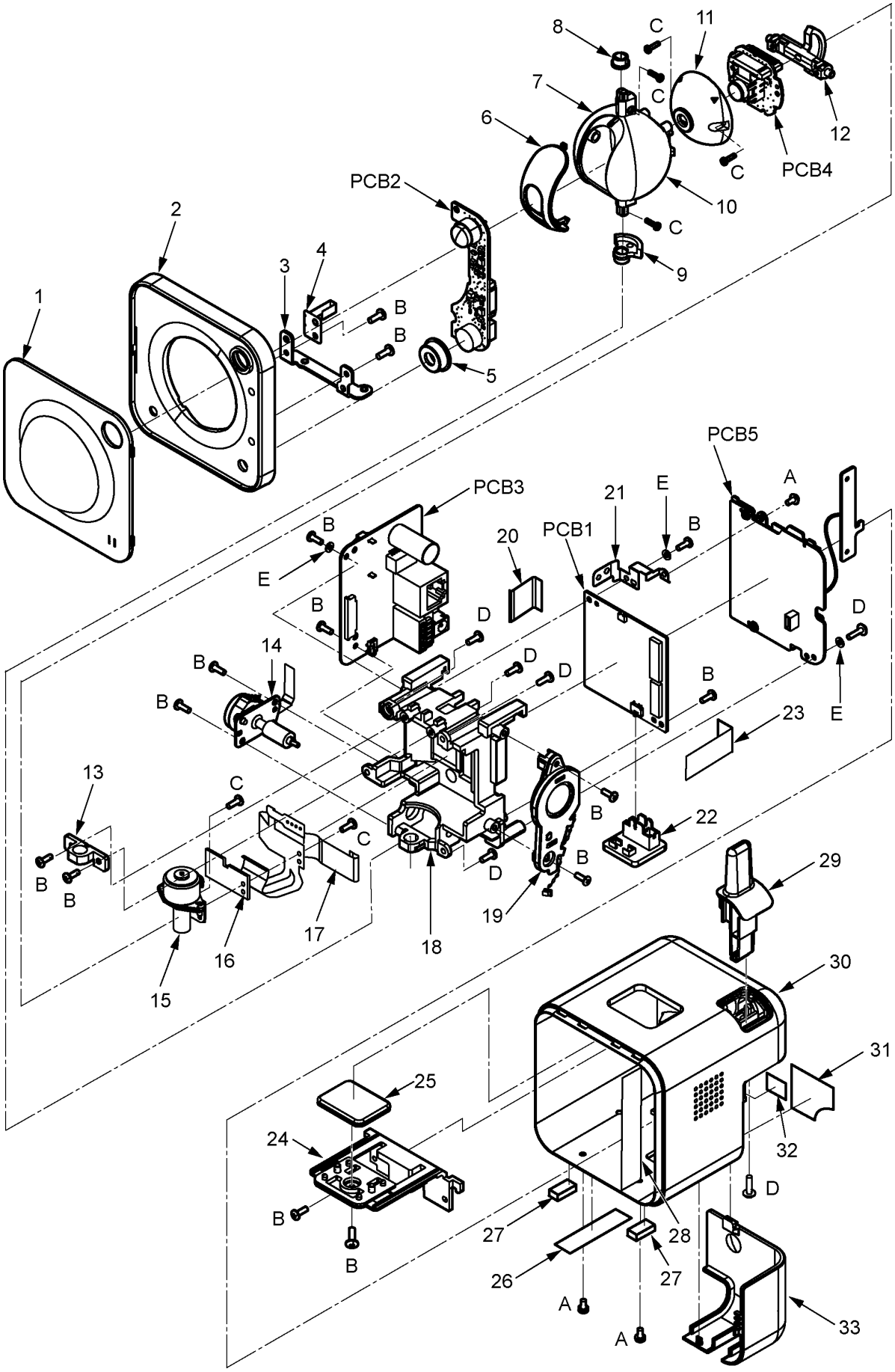
15 Appendix Information of Schematic Diagram

15.1. Terminal Guide of ICS, Transistors and Diodes

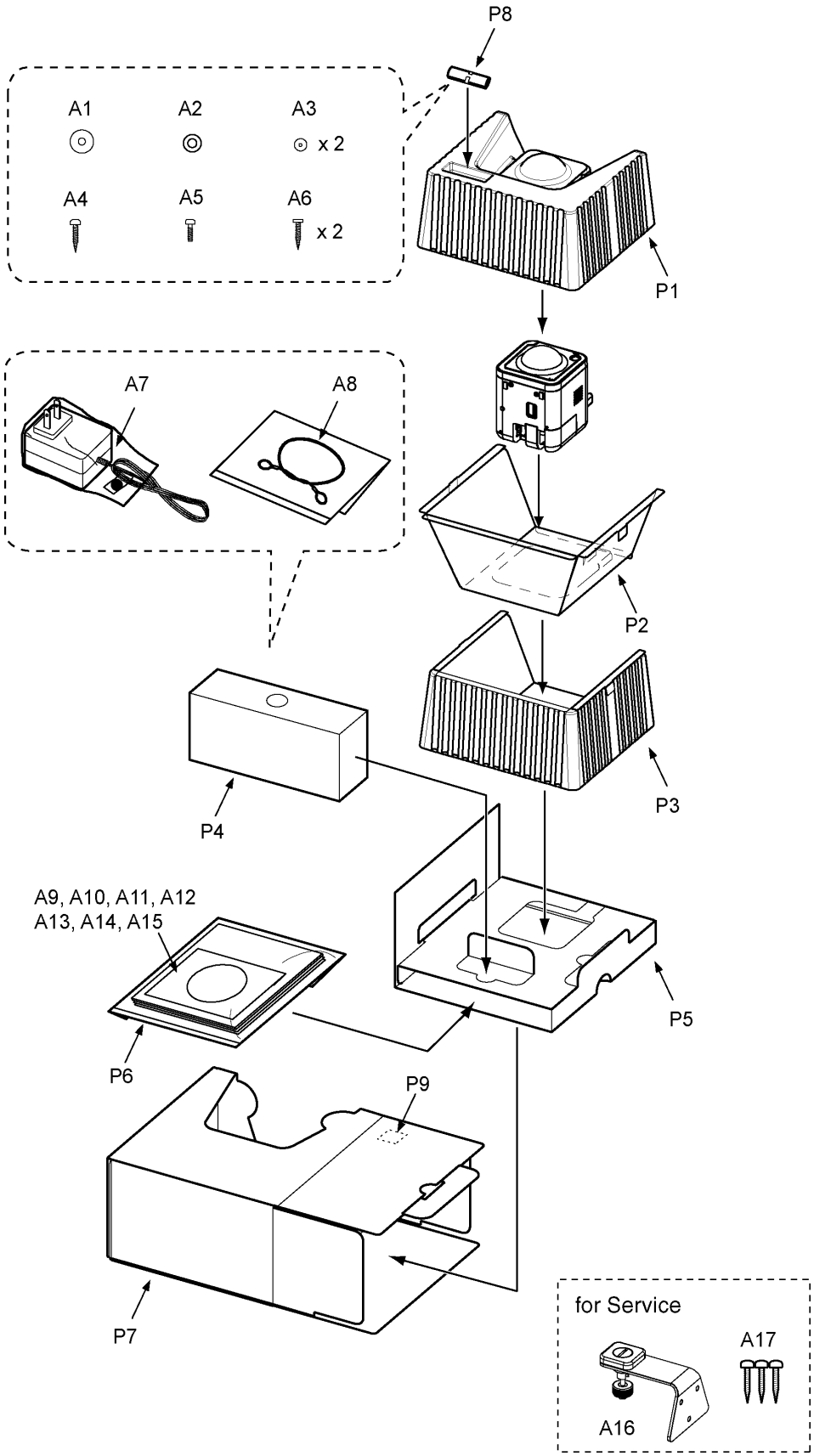
 MN2PS00003RF	 C0DBFYY00103	 C3ABSY000052	 C0EBE0000350	 C0DBAYY00341
 C0DBAYY00555	 B1CFFB000001	 C0JBAS000229	 C1AB00003196	 C0ABBA000186
 MA111 MA8043	 PQVDBRPY1204	 C0DBAYY00289 C0DBFYY00034	 C1ZBZ0003864	 B1DHBD000005
 MA741WK MA143A	 MA22D2800L	 C4ZZ00000056	 PQVTDTC143E PQVTDTA143EU PQVTDTA143TU B1GBGFCJ0002	 C1CB00002566
 C0GBE0000015				

16 Exploded View and Replacement Parts List

16.1. Cabinet and Electrical Parts Location



16.2. Accessories and Packing Materials



16.3. Replacement Parts List

Note:

1. RTL (Retention Time Limited)
   The marking (RTL) indicates that the Retention Time is limited for this item.
   After the discontinuation of this assembly in production, the item will continue to be available for a specific period of time. The retention period of availability depends on the type of assembly and the laws governing parts and product retention. At the end of this period, the assembly will no longer be available.
2. Important safety notice
   Components identified by the ⚠ mark indicates special characteristics important for safety. When replacing any of these components, only use specified manufacture's parts.
3. The S mark means the part is one of some identical parts. For that reason, it may be different from the installed part.
4. ISO code (Example: ABS-94HB) of the remarks column shows quality of the material and a flame resisting grade about plastics.
5. RESISTORS & CAPACITORS
   Unless otherwise specified;
   All resistors are in ohms (Ω), k=1000Ω, M=1000kΩ
   All capacitors are in MICRO FARADS (μF), p=μ(μF)
   *Type & Wattage of Resistor

Type

ERC:Solid ERD:Carbon PQ4R:Chip	ERX:Metal Film ERG:Metal Oxide ERO:Metal Film	PQRD:Carbon PQRQ:Fuse ERF:Wire Wound

Wattage

10,16,18:1/8W	14,25,S2:1/4W	12,50,S1:1/2W	1:1W	2:2W	5:5W

ECFD:Semi-Conductor ECQS:Styrol PQCBX,ECUV:Chip ECMS:Mica	ECCD,ECKD,PQCBC,PQVP : Ceramic ECQM,ECQV,ECQE,ECQU,ECQB : Polyester ECEA,ECSZ,ECOS : Electrolytic ECQP : Polypropylene

Voltage

ECQ Type	ECQG ECQV Type	ECSZ Type	Others	
1H : 50V 2A : 100V 2E : 250V 2H : 500V	05 : 50V 1 : 100V 2 : 200V	OF : 3.15V 1A : 10V 1V : 35V OJ : 6.3V	OJ : 6.3V 1A : 10V 1C : 16V 1E,25 : 25V	1V : 35V 50,1H : 50V 1J : 63V 2A : 100V

16.3.1. Cabinet and Electrical Parts

Safety	Ref. No.	Part No.	Part Name & Description	Remarks
	1	PNKV1050W	DOME	PC-HB
	2	PNKM1095Y1	FRONT CABINET	ABS-HB
	3	PNMH1056Z	CONNECT PLATE	
	4	PNUS1095Z	MOTOR SPRING	
	5	PNMG1002Z	MIC RUBBER	
	6	PNKV1051Z1	EYE CENTER COVER	ABS-HB
	7	PNKE1034Z1	EYE LEFT COVER	ABS-HB
	8	PNHR1151Z	PAN CAP	POM-HB
	9	PNHR1152Z	PAN GEAR	POM-HB
	10	PNKE1033Z1	EYE RIGHT COVER	ABS-HB
	11	PNKV1053Z1	LENS COVER	ABS-HB
	12	PNHR1153Z	TILT GEAR	POM-HB
	13	PNHR1150Z	EYE LOCK	ABS-HB
	14	PNWQCM210	PAN MOTOR	
	15	PNWQC210A	TILT MOTOR	
	16	PNHX1201Z	PROTECTION SHEET	
	17	PNLB1691Z	TILT FPC	
	18	PNUA1018Z	CHASSIS	ABS-HB-GF20
	19	PNWHC230A	SPEAKER HOLDER ASSY	
	20	PNJE1042Z	FLAT CABLE	
	21	PNMH1082Z	EARTH PLATE	
	22	PNBC1306Z1	SLIDE BUTTON	ABS-HB
	23	PNJE1041Z	FLAT CABLE	
	24	PNBC1310Z1	LENS BUTTOM	ABS-HB
	25	PNBC1309Z1	LENS BUTTON TOP	
	26	PNQT1705Z	INDICATION PLATE-LABEL	
	27	PNHA1008Z	RUBBER PARTS	
	28	PNHX1186Z	LIGHT SHIELDING SHEET	
	29	PNKV1075Z1	ANTENNA COVER	ABS-HB
	30	PNKF1088Z1	REAR CABINET	ABS-HB
	31	PNGT2582Z	NAME PLATE	
	32	PNQT1706Z	INDICATION PLATE-LABEL	
	33	PNKV1071Z1	LAN COVER	ABS-HB
	A	XTW2+4LFJ45	SCREW	
	B	XTB2+6GFJ	SCREW	
	C	XQN16+CJ6FJ	SCREW	
	D	XTW2+R8PFJ	SCREW	
	E	XWA2BFJ	WASHER	

16.3.2. Accessories and Packing Materials

Safety	Ref. No.	Part No.	Part Name & Description	Remarks
	A1	XWG4F16VW	WASHER	
	A2	XWG26D12VW	WASHER	
	A3	XWG35FJ	WASHER	
	A4	XTB4+20AFJ	WOOD SCREW	
	A5	XTB26+10GFJ	SMALL SCREW	
	A6	PQHE5004X	WOOD SCREW	
⚠	A7	PQLV206Y	AC ADAPTOR	
	A8	PQME10080Z	SAFETY WIRE	
	A9	PNQC1016P	INSTRUCTION BOOK, CD-ROM	
	A10	PNQW1846Y	LEAFLET	
	A11	PNQW1943Z	LEAFLET	
	A12	PNQX1991X	INSTRUCTION BOOK, IMPORTANT INFORMATION	
	A13	PNQX1992Y	INSTRUCTION BOOK, SETUP GUIDE	
	A14	PNQX2272Z	INSTRUCTION BOOK, INSTALLATION GUIDE	
	A15	PNQX2377Y	INSTRUCTION BOOK, SETUP GUIDE (FOR VIERA)	
	A16	PNKL1008Z	STAND (for Service)	
	A17	XTB4+20AFJ	TAPPING SCREW (for Service)	
	P1	PNPE1017Z	BLISTER TOP	
	P2	PNPE1019Z	BACK GROUND SHEET	
	P3	PNPE1018Z	BLISTER BOTTOM	
	P4	PNPN1163Z	CUSHION	
	P5	PNPD1350Z	CUSHION	
	P6	XZB20X30A05	PROTECTION COVER	
	P7	PNPK2636Z	GIFT BOX	
	P8	XZB05X08A03	PROTECTION COVER	
	P9	PNHT1001Z	SECURITY TAG	

16.3.3. Main Board Parts

Safety	Ref. No.	Part No.	Part Name & Description	Remarks
	PCB1	PNWP1C230A	MAIN BOARD ASS'Y (RTL)	
			(ICS)	
	IC101	MN2PS00003RF	IC	
	IC102	There is no parts supply of only IC102 please order PCB1(PNWP1C230A).		
	IC103	C3ABSY000052	IC	
	IC104	C3ABSY000052	IC	
	IC105	C0EBE0000350	IC	
	IC106	C0DBAYY00341	IC	

Safety	Ref. No.	Part No.	Part Name & Description	Remarks
	IC107	C0DBAYY00555	IC	
	IC301	C1CB00002566	IC	
	IC302	C0DBFYY00034	IC	
	IC303	C0GBE0000015	IC	
	IC304	C0DBFYY00103	IC	
			(TRANSISTORS)	
	Q104	B1CFFB000001	TRANSISTOR(SI)	
	Q105	B1CFFB000001	TRANSISTOR(SI)	
	Q106	PQVTDTA143TU	TRANSISTOR(SI)	S
	Q107	PQVTDTA143TU	TRANSISTOR(SI)	S
			(DIODE)	
	D101	MA8043	DIODE(SI)	S
			(CAPACITORS)	
	C101	ECUE1C104ZFQ	0.1	
	C102	ECUE1C104ZFQ	0.1	
	C103	ECUE1C104ZFQ	0.1	
	C105	ECUE1C104ZFQ	0.1	
	C107	ECUE1C104ZFQ	0.1	
	C108	ECUE1C104ZFQ	0.1	
	C109	ECUE1C104ZFQ	0.1	
	C111	ECUE1C104ZFQ	0.1	
	C113	ECUE1C104ZFQ	0.1	
	C115	ECUE1C104ZFQ	0.1	
	C117	ECUE1C104ZFQ	0.1	
	C119	ECUE1C104ZFQ	0.1	
	C122	ECUE1C104ZFQ	0.1	
	C124	ECUE1C104ZFQ	0.1	
	C127	ECUE1C104ZFQ	0.1	
	C129	ECUE1C104ZFQ	0.1	
	C130	ECUE1C104ZFQ	0.1	
	C132	ECUE1C104ZFQ	0.1	
	C134	ECUE1C104ZFQ	0.1	
	C135	ECUV0J105KBV	1	
	C136	ECUE1H101JCQ	100p	
	C137	ECUE1H101JCQ	100p	
	C138	ECUE1C104ZFQ	0.1	
	C139	ECUE1H101JCQ	100p	
	C142	ECUE1C104ZFQ	0.1	
	C143	ECUE1C104ZFQ	0.1	
	C144	ECUE1C104ZFQ	0.1	
	C145	ECUE1C104ZFQ	0.1	
	C146	ECUE1C104ZFQ	0.1	
	C147	ECUE0J105KBQ	1	
	C148	F1J0J1060006	10	
	C149	ECUE0J105KBQ	1	
	C150	ECUE0J105KBQ	1	
	C151	F1J0J1060006	10	
	C152	ECUE1H3R0CCQ	3	
	C153	ECUE1H2R0CCQ	2	
	C154	ECUE1C104ZFQ	0.1	
	C155	ECUE1C103KBQ	0.01	
	C156	ECUE1C104ZFQ	0.1	
	C157	ECUE1C104ZFQ	0.1	
	C159	ECUE1C104ZFQ	0.1	
	C160	F1J0J1060006	10	
	C161	ECUE1C104ZFQ	0.1	
	C162	ECUE1C104ZFQ	0.1	
	C164	ECUE1C104ZFQ	0.1	
	C165	ECUE1C104ZFQ	0.1	
	C169	ECUE1C104ZFQ	0.1	
	C170	ECUE1C104ZFQ	0.1	
	C173	ECUE1C104ZFQ	0.1	
	C175	ECUE1C104ZFQ	0.1	
	C176	ECUE1C104ZFQ	0.1	
	C177	ECUE1C104ZFQ	0.1	
	C179	ECUE1C104ZFQ	0.1	
	C180	ECUE0J105KBQ	1	
	C181	ECUE1C104ZFQ	0.1	
	C182	ECUE1C104ZFQ	0.1	
	C183	ECUE1C104ZFQ	0.1	

Safety	Ref. No.	Part No.	Part Name & Description	Remarks
	C184	ECUE1C104ZFQ	0.1	
	C186	ECUE1C104ZFQ	0.1	
	C188	ECUE1C104ZFQ	0.1	
	C189	ECUE1C104ZFQ	0.1	
	C190	ECUE1C104ZFQ	0.1	
	C192	ECUE1C104ZFQ	0.1	
	C198	ECUE1C104ZFQ	0.1	
	C199	ECUE1C104ZFQ	0.1	
	C200	ECUE1C104ZFQ	0.1	
	C201	ECUE1C104ZFQ	0.1	
	C202	ECUE1C104ZFQ	0.1	
	C203	ECUE1H101JCQ	100p	
	C204	F1J0J1060006	10	
	C205	F1J0J2260004	22	
	C206	ECUE1C104ZFQ	0.1	
	C301	F1J0J1060006	10	
	C302	F1J0J1060006	10	
	C303	ECUE1C104ZFQ	0.1	
	C304	ECUE1C104ZFQ	0.1	
	C305	ECUE0J105KBQ	1	
	C306	ECUE1C104ZFQ	0.1	
	C307	ECUE1H101JCQ	100p	
	C308	ECUE1C104ZFQ	0.1	
	C309	ECUE1H100CCQ	10p	
	C310	ECUE1C104ZFQ	0.1	
	C311	ECUE1C104ZFQ	0.1	
	C312	ECUE1H9R0CCQ	9	
	C315	ECUE0J105KBQ	1	
	C316	ECUE1C104ZFQ	0.1	
	C319	ECUE1C104ZFQ	0.1	
	C320	F1J0J1060006	10	
	C326	ECUE1H102KBQ	0.001	
	C327	ECUE1H102KBQ	0.001	
	C328	ECUE1C104ZFQ	0.1	
	C329	ECUE1C104ZFQ	0.1	
	C330	ECUE1C104ZFQ	0.1	
	C331	ECUE1C104ZFQ	0.1	
	C333	ECUV1C105KBV	1	
	C334	F1J0J1060006	10	
	C335	ECUE1C104ZFQ	0.1	
	C336	ECUE1C104ZFQ	0.1	
	C337	ECUE1C104ZFQ	0.1	
	C338	F1J0J1060006	10	
	C339	F1H0G4750001	4.7	
	C340	F1H0G4750001	4.7	
	C341	ECUE1C104ZFQ	0.1	
	C342	F1H0G4750001	4.7	
	C343	ECUE1C104ZFQ	0.1	
	C344	F1J0J1060006	10	
	C345	ECUE1C104ZFQ	0.1	
	C346	ECUE1C104ZFQ	0.1	
	C347	F1H0G4750001	4.7	
	C348	ECUE1C104ZFQ	0.1	
	C351	ECUE1C104ZFQ	0.1	
	C352	ECUE1C104ZFQ	0.1	
	C354	ECUE1C104ZFQ	0.1	
			(CONNECTORS)	
	CN301	K1MN30B00137	CONNECTOR	
	CN302	K1MN30B00137	CONNECTOR	
	CN303	K1MY04AA0057	CONNECTOR	
	CN304	K1MN21BA0184	CONNECTOR	
	CN305	K1KB20A00142	CONNECTOR	
			(COILS AND CERAMIC FILTERS)	
	L101	J0JBC0000071	CERAMIC FILTER	
	L102	J0JBC0000071	CERAMIC FILTER	
	L103	J0JBC0000071	CERAMIC FILTER	
	L104	G1C4R7MA0203	COIL	
	L105	G1C4R7MA0203	COIL	
	L106	J0JBC0000071	CERAMIC FILTER	
	L107	G1C100KA0066	COIL	

Safety	Ref. No.	Part No.	Part Name & Description	Remarks
	L111	J0JYC0000061	IC FILTER	
	L112	J0JYC0000053	IC FILTER	
	L301	G1C100K00031	COIL	
	L302	G1C1R0JA0041	COIL	
	L303	J0JYC0000047	IC FILTER	
	L304	J0JYC0000047	IC FILTER	
	L305	J0JBC0000071	CERAMIC FILTER	
	L314	G1C100KA0066	COIL	
			(RESISTORS)	
	R101	ERJ2GEJ472X	4.7k	
	R103	ERJ2RKF2402	24k	
	R104	ERJ2GEJ473	47k	
	R105	ERJ2GEJ473	47k	
	R108	ERJ2GEJ103	10k	
	R110	ERJ2GEJ473	47k	
	R111	ERJ2GEJ473	47k	
	R112	ERJ2GEJ122	1.2k	
	R115	ERJ2RKF4301	4.3k	
	R118	ERJ2RKF1002	10k	
	R119	ERJ2GE0R00	0	
	R121	ERJ2GEJ103	10k	
	R122	ERJ2GEJ103	10k	
	R127	ERJ2GEJ105X	1M	
	R128	ERJ2GEJ101	100	
	R146	ERJ2GEJ103	10k	
	R148	ERJ2GEJ103	10k	
	R151	ERJ2GEJ330	33	
	R152	ERJ2GEJ330	33	
	R153	ERJ2GEJ473	47k	
	R164	ERJ2GEJ102	1k	
	R165	ERJ2GEJ102	1k	
	R166	ERJ2GEJ102	1k	
	R167	ERJ2GEJ102	1k	
	R186	ERJ2GEJ102	1k	
	R187	ERJ2GEJ102	1k	
	R195	ERJ2GEJ473	47k	
	R197	ERJ2GEJ103	10k	
	R301	ERJ2GEJ103	10k	
	R302	ERJ2RKF6491	6.49k	
	R303	ERJ2GEJ105X	1M	
	R304	ERJ2GEJ102	1k	
	R306	ERJ3EKF49R9	49.9	
	R307	ERJ3EKF49R9	49.9	
	R308	ERJ3EKF49R9	49.9	
	R309	ERJ3EKF49R9	49.9	
	R310	ERJ2GE0R00	0	
	R327	ERJ2GEJ562X	5.6k	
	R328	ERJ2GEJ821	820	
	R329	ERJ2GE0R00	0	
	R334	ERJ2GEJ470	47	
	R335	ERJ2GE0R00	0	
	R336	ERJ2GE0R00	0	
	R340	ERJ2GEJ121	120	
	R341	ERJ2GEJ121	120	
	R342	ERJ2GEJ121	120	
	R343	ERJ2GEJ121	120	
	R362	ERJ2GEJ562X	5.6k	
	R363	ERJ2GEJ562X	5.6k	
	R367	ERJ2GEJ103	10k	
	R385	ERJ2GEJ331	330	
	R388	ERJ2GEJ104	100k	
	R389	ERJ2GEJ103	10k	
	R390	ERJ2GE0R00	0	
			(COMPONENTS PARTS)	
	RA101	D1H84734A024	RESSISTOR ARRAY	
	RA102	D1H84734A024	RESSISTOR ARRAY	
	RA103	D1H84734A024	RESSISTOR ARRAY	
	RA104	D1H84734A024	RESSISTOR ARRAY	
	RA305	D1H84704A024	RESSISTOR ARRAY	
	RA306	D1H84704A024	RESSISTOR ARRAY	

Safety	Ref. No.	Part No.	Part Name & Description	Remarks
			(SWITCHES)	
	SW101	K0H1BB000094	PUSH SWITCH	
	SW301	K0D122A00098	SLIDE SWITCH	
	SW302	K0D122A00098	SLIDE SWITCH	
			(CRYSTAL OSCILLATORS)	
	X101	H0J240500062	CRYSTAL OSCILLATOR	
	X301	H0J250500061	CRYSTAL OSCILLATOR	

16.3.4. Sensor Board Parts

Safety	Ref. No.	Part No.	Part Name & Description	Remarks
	PCB2	PNWP2C230A	SENSOR BOARD ASS'Y (RTL)	
			(ICS)	
	IC701	C0JBAS000229	IC	
	IC702	C1AB00003196	IC	
	IC703	C0ABBA000186	IC	
	IC704	L2CD00000045	PHOTO ELECTRIC TRANS-DUCER	
			(TRANSISTORS)	
	Q701	PQVTDTC143E	TRANSISTOR(SI)	S
	Q702	PQVTDTC143E	TRANSISTOR(SI)	S
	Q703	PQVTDTC143E	TRANSISTOR(SI)	S
	Q704	PQVTDTC143E	TRANSISTOR(SI)	S
			(DIODES)	
	D703	MA111	DIODE(SI)	S
	LED701	PQVDBRPY1204	DIODE(SI)	S
	LED702	PQVDBRPY1204	DIODE(SI)	S
			(CAPACITORS)	
	C701	F1H0G4750001	4.7	
	C702	ECUE1C104ZFQ	0.1	
	C703	ECUE1C104ZFQ	0.1	
	C704	ECUE1C104ZFQ	0.1	
	C705	F1J0J2260004	22	
	C706	ECUE1C104ZFQ	0.1	
	C707	ECUE1A104KBQ	0.1	
	C708	F1H0G4750001	4.7	
	C709	F1G0J225A008	2.2	
	C710	F1J0J1060006	10	
	C711	ECUE1H222KBQ	0.0022	
	C712	ECUV1A224KBV	0.22	
	C713	F1H0G4750001	4.7	
	C718	F1J0J2260004	22	
	C719	F1J0J2260004	22	
	C720	ECUE1A104KBQ	0.1	
	C721	ECUV1C105KBV	1	
	C722	ECUE1C104ZFQ	0.1	
	C723	ECUE0J105KBQ	1	
	C725	ECUE1A104KBQ	0.1	
	C726	ECUE1H102KBQ	0.001	
	C728	F1J0J2260004	22	
	C729	F1J0J2260004	22	
	C730	ECUE1C223KBQ	0.022	
	C731	ECUE1H102KBQ	0.001	
	C733	ECUE1H102KBQ	0.001	
	C783	ECUE1H101JCQ	100p	
	C784	ECUE1H101JCQ	100p	
	C785	ECUE1H101JCQ	100p	
			(CONNECTORS)	
	CN701	K1MN21AA0058	CONNECTOR	
	CN702	K1KA02AA0229	CONNECTOR	
			(COILS AND CERAMIC FIL-TERS)	
	L701	G1C4R7MA0098	COIL	
	R733	J0JYC0000060	IC FILTER	
	R734	J0JYC0000060	IC FILTER	

Safety	Ref. No.	Part No.	Part Name & Description	Remarks
			(RESISTORS)	
	R701	ERJ2RKF2202	22k	
	R702	ERJ2GEJ431	430	
	R703	ERJ2GEJ101	100	
	R704	ERJ2GEJ431	430	
	R705	ERJ2GEJ101	100	
	R710	ERJ2GEJ103	10k	
	R711	ERJ2GEJ103	10k	
	R712	ERJ2RKF6803	680k	
	R713	ERJ2RKF3903	390k	
	R716	ERJ2RKF4703	470k	
	R717	ERJ2RKF4703	470k	
	R718	ERJ2RKF1004	1M	
	R721	ERJ2GEJ104	100k	
	R722	ERJ2GEJ122	1.2k	
	R725	ERJ2RKF1502	15k	
	R726	ERJ2GE0R00	0	
	R727	ERJ2RKF8203	820k	
	R728	ERJ2RKF1502	15k	
	R729	ERJ2GE0R00	0	
	R730	ERJ2GEJ473	47k	
	R731	ERJ2GEJ103	10k	
	R732	ERJ2GEJ222	2.2k	
	R782	ERJ2GEJ471	470	
			(VARISTOR)	
	CF701	D4ZZ00000024	VARISTOR	
			(OTHERS)	
	MIC701	L0CBAY000018	BUILTIN-MICROPHONE	
	TH701	D4CC14730006	THERMISTOR	

16.3.5. I/O Board Parts

Safety	Ref. No.	Part No.	Part Name & Description	Remarks
	PCB3	PNWP3C230A	IO BOARD ASS'Y (RTL)	
			(ICS)	
	IC901	C0DBAYY00289	IC	
	IC902	C1ZBZ0003864	IC	
			(TRANSISTORS)	
	Q901	B1DHBD000005	TRANSISTOR(SI)	
	Q902	B1GBGFCJ0002	TRANSISTOR(SI)	
	Q904	PQVTDTA143EU	TRANSISTOR(SI)	S
	Q905	PQVTDTA143EU	TRANSISTOR(SI)	S
			(DIODES)	
	D901	MA111	DIODE(SI)	S
	D902	MA741WK	DIODE(SI)	S
	D903	MA143A	DIODE(SI)	S
	D904	MA143A	DIODE(SI)	S
	D905	MA22D2800L	DIODE(SI)	
	D906	MA8043	DIODE(SI)	S
	D908	MA22D2800L	DIODE(SI)	
	D909	MA8043	DIODE(SI)	S
	D910	MA8043	DIODE(SI)	S
	D911	MA8043	DIODE(SI)	S
	D912	MA8043	DIODE(SI)	S
	D913	MA8043	DIODE(SI)	S
	D914	MA143A	DIODE(SI)	S
			(BATTERY)	
	BT901	N4BCY48Y0001	BATTERY	
			(CAPACITORS)	
	C901	F1K3A102A002	0.001	
	C902	ECUE1C104ZFQ	0.1	
	C903	ECUE1H3R0CCQ	3	
	C904	ECUE1C104ZFQ	0.1	
	C905	ECUE1C104ZFQ	0.1	

Safety	Ref. No.	Part No.	Part Name & Description	Remarks
	C906	ECUE1H3R0CCQ	3	
	C907	F1K3A102A002	0.001	
	C908	ECUE1H102KBQ	0.001	
	C909	ECUE1C104ZFQ	0.1	
	C910	F2A1C2220070	2200	
	C911	F1K1C1060001	10	
	C912	ECUE1C104ZFQ	0.1	
	C913	ECUE1C104ZFQ	0.1	
	C914	ECUE1H101JCQ	100p	
	C915	ECUV1C105KBV	1	
	C916	ECUE1C104ZFQ	0.1	
	C918	ECUE1H102KBQ	0.001	
	C919	ECUV1H151JCV	150p	
	C921	ECUE1H102KBQ	0.001	
	C922	F1J0J2260004	22	
	C923	ECUE1C104ZFQ	0.1	
	C924	F1J0J1060006	10	
	C925	ECUE1C104ZFQ	0.1	
	C926	ECUE1C104ZFQ	0.1	
	C927	ECUE1C104ZFQ	0.1	
	C928	ECUE1C104ZFQ	0.1	
	C929	ECUE1C104ZFQ	0.1	
	C931	ECUV1C105KBV	1	
	C932	F1J0J1060006	10	
	C934	ECUE1C104ZFQ	0.1	
	C945	ECUE1C104ZFQ	0.1	
			(JACK AND CONNECTORS)	
	CN901	K1MN30B00137	CONNECTOR	
	CN903	K4AC06A00018	TERMINAL-TERMINAL PLATE	
	JK901	K2LC108A0007	JACK/SOCKET	
	JK902	K2EC2A000001	JACK/SOCKET	
			(COILS AND CERAMIC FILTERS)	
	FL901	J0MAB0000185	IC FILTER	
	FL902	J0MAB0000185	IC FILTER	
	L901	J0JCC0000368	CERAMIC FILTER	
	L902	G0B150G00002	COIL	
	L903	J0JGC0000020	IC FILTER	
	L904	PQLE1G5K3220	COIL	S
	L905	J0JBC0000107	IC FILTER	
	L906	J0JBC0000107	IC FILTER	
	L907	J0JBC0000107	IC FILTER	
	L908	J0JCC0000079	CERAMIC FILTER	
	L909	J0JCC0000079	CERAMIC FILTER	
	L910	J0JCC0000079	CERAMIC FILTER	
	L911	J0JCC0000079	CERAMIC FILTER	
	L912	J0JCC0000079	CERAMIC FILTER	
	L913	J0JYC0000060	IC FILTER	
	L914	J0JYC0000060	IC FILTER	
			(FUSES)	
	CF902	D4FBR200A003	FUSE	
	F901	K5H502Y00002	FUSE	
			(RESISTORS)	
	R901	PQ4R18XJ100	10	S
	R902	ERJ2GEJ103	10k	
	R903	ERJ3GEYJ101	100	
	R907	ERJ2GEJ122	1.2k	
	R910	ERJ2GEJ103	10k	
	R911	ERJ3GEYJ750	75	
	R912	ERJ3GEYJ750	75	
	R917	ERJ2GEJ100	10	
	R918	ERJ3GEYJ750	75	
	R919	ERJ3GEYJ750	75	
	R920	ERJ2GEJ103	10k	
	R925	ERJ3BSFR10V	0.1	
	R926	ERJ3BSFR10V	0.1	
	R927	ERJ3EKF3302	33k	
	R928	ERJ3EKF1202	12k	
	R930	ERJ2GEJ103	10k	

Safety	Ref. No.	Part No.	Part Name & Description	Remarks
	R940	ERJ2GEJ102	1k	
	R947	ERJ2GEJ103	10k	
			(VARISTOR)	
	CF901	D4ZZ00000024	VARISTOR	
			(SWITCH)	
	SW903	K0H1BB000063	PUSH SWITCH	
			(TRANSFORMER)	
	T901	G5BYC0000030	TRANSFORMER	
			(CRYSTAL OSCILLATOR)	
	X901	H0A327200165	CRYSTAL OSCILLATOR	

16.3.6. LENS Board Parts

Safety	Ref. No.	Part No.	Part Name & Description	Remarks
	PCB4	PNWP4C230A	LENS BOARD ASS'Y (RTL)	
			(IC)	
	IC401	C4ZZ00000056	IC	
			(CAPACITORS)	
	C401	F1H0G4750001	4.7	
	C404	ECUE1C104ZFQ	0.1	
	C406	ECUE1H101JCQ	100p	
	C407	ECUE1C104ZFQ	0.1	
	C408	F1H0G4750001	4.7	
	C410	ECUE1H101JCQ	100p	
	C412	ECUE1C104ZFQ	0.1	
			(CONNECTORS)	
	CN401	K1MN27AA0058	CONNECTOR	
	CN402	K1MN27AA0058	CONNECTOR	
			(COIL AND CERAMIC FIL-TERS)	
	FL401	J0HAYY000047	IC FILTER	
	FL402	J0HAYY000047	IC FILTER	
	L411	J0JYC0000055	COIL	
			(RESISTORS)	
	R402	ERJ2GE0R00	0	
	R403	ERJ2GE0R00	0	
	R404	ERJ2GE0R00	0	
			(COMPONENTS PART)	
	RA401	D1H84704A024	RESSISTOR ARRAY	

16.3.7. RF Board Parts

Safety	Ref. No.	Part No.	Part Name & Description	Remarks
	PCB5	PNWP5C230A	RF BOARD ASS'Y (RTL)	